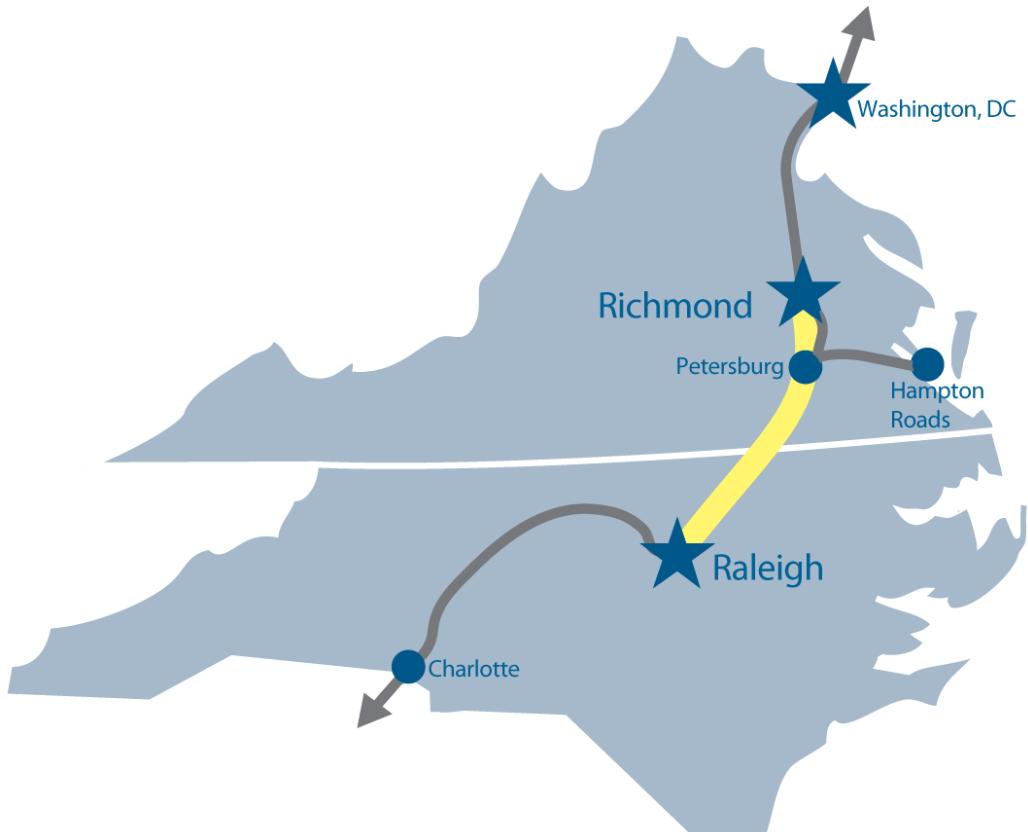


# DRAFT RECOMMENDATION REPORT

**SOUTHEAST HIGH SPEED RAIL  
RICHMOND, VA, TO RALEIGH, NC  
TIER II ENVIRONMENTAL IMPACT STATEMENT**

February 1, 2012



# DRAFT RECOMMENDATION REPORT

## PREFERRED RAIL ALTERNATIVES

### SOUTHEAST HIGH SPEED RAIL RICHMOND, VA, TO RALEIGH, NC TIER II ENVIRONMENTAL IMPACT STATEMENT

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Date of Approval

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Secretary Gene Conti  
North Carolina Department of Transportation

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Date of Approval

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Secretary Sean Connaughton  
Commonwealth Transportation Board

February 1, 2012

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## INTRODUCTION

This report presents the recommendations of the Virginia Department of Rail and Public Transportation (DRPT) and the North Carolina Department of Transportation (NCDOT) Rail Division to the Federal Railroad Administration (FRA) for the preferred rail alternatives for each of the 26 sections of the Southeast High Speed Rail (SEHSR) corridor between Richmond, VA, and Raleigh, NC. These recommendations are based on consideration of impacts to the human and natural environment, costs, and operability/constructability, along with the public and agency comments received following the publication of the SEHSR Tier II Draft Environmental Impact Statement for the Richmond, VA, to Raleigh, NC, portion of the SEHSR in May 2010 (DEIS).

It should be noted that the recommendations in this report address only the selection of preferred rail alignments. Associated highway revisions are under consideration based on public comment. Any substantial roadway changes will be presented to the public at a series of forthcoming project update meetings. All changes will be described in the SEHSR Tier II Richmond, VA, to Raleigh, NC, Final Environmental Impact Statement (FEIS), which will also provide detailed responses to the many comments received on the DEIS. The FEIS will be published by FRA subsequent to this report and will present FRA's preferred alternatives for the project and will document the effects of the project on the human and natural environment. A public comment period will follow publication of the FEIS. These comments will be addressed in a record of decision (ROD), which explains the basis for the project decisions. The project cannot be advanced until the ROD has been signed by FRA.

NCDOT and DRPT's recommended preferred rail alternatives are outlined below. While it is the anticipation of the state agencies that FRA will endorse the recommendations presented here, this report is non-binding and the preferred alternative ultimately presented in the FEIS is subject to the discretion of FRA.

*NCDOT and DRPT have been working together since the early 1990s to develop the SEHSR corridor.*

## PROJECT BACKGROUND

The overall SEHSR project involves the incremental development, implementation, and operation of high speed rail (HSR) passenger service in the approximately 450-mile travel corridor from Washington, DC, through Richmond, VA, and Raleigh, NC, to Charlotte, NC. NCDOT and DRPT, with their federal partners, FRA and the Federal Highway Administration (FHWA), have been working together since the early 1990s to develop the SEHSR corridor.

A “tiered” approach was adopted for the required environmental studies because of the length of the corridor. The original SEHSR Tier I Environmental Impact Statement (EIS) and Record of Decision (2002) covered the entire Washington, DC, to Charlotte, NC, corridor at a program level, establishing the overall project purpose and need and modal alternative along with the preferred corridor (i.e., it was not a “build” document).

The Tier II DEIS was published in May 2010 and included detailed environmental analysis appropriate to the proposed build actions planned within the preferred corridor between Richmond, VA, and Raleigh, NC (R2R). There is existing freight and passenger rail service operating within the preferred corridor from Richmond north to Washington, DC, and from Raleigh west to Charlotte, NC. Both states have active rail improvement programs in these portions of the corridor, and these improvements are covered under various other environmental documents.

One such improvement program is DRPT’s effort to develop the Hampton Roads extension of the SEHSR corridor east from Richmond to Hampton Roads. It is expected that the Hampton Roads extension will follow the same alignment and use the same improvements as the SEHSR R2R between Richmond and Petersburg and continue eastward on a separate alignment to the CSX connection at North Collier Yard in Petersburg, VA, and on to Norfolk, VA. A Tier I DEIS for the Richmond to Hampton Roads Passenger Rail Project was completed in December 2009 and a FEIS has been submitted to FRA for review and approval.

The planned and anticipated rail improvements in the Raleigh to Charlotte and Richmond to Washington, DC, segments of the SEHSR corridor are needed for reliability, safety, capacity, and congestion management, and facilitate the overall higher speed rail system.

For engineering purposes and evaluation of impacts, the SEHSR R2R project corridor is divided into 26 sections (Exhibit 1). There are three alternatives in each section, and each rail alternative includes an associated set of road work improvements/redesign. In many areas, the alternatives are concurrent. The endpoints of each of the 26 sections are in locations where the alternative alignments are in a common location. This allows the alternatives to be evaluated section by section, permitting the selection of “best-fit” preferred alternatives for the entire study corridor.

Speed is one of the factors used to evaluate the different rail alternatives in the 26 sections of the SEHSR R2R project. There are four metrics used to describe the speed of a rail alternative:

- Maximum authorized speed (MAS) is the maximum allowable speed a train may operate based on authorization from the owner of the rail corridor and FRA. As of January 2012, the future MAS for the Richmond, VA, to Raleigh, NC, portion of the SEHSR is anticipated to be:
  - Richmond, VA, to Centralia, VA – 79 mph
  - Centralia, VA, to Collier, VA (south of Petersburg) – 90 mph
  - Collier, VA, to Raleigh, NC – 110 mph.
- Average running speed is based on the total amount of time it takes a train to go a set distance. It accounts for “dwell time” (such as station stops), schedule recovery time, and speed restrictions below MAS for curves and other features. Modeling to determine the average running speeds within the 26 sections of the SEHSR project will be completed once a preferred alternative has been selected.
- Design speed is the maximum safe speed that can be maintained over a specified section of rail. It is based on several factors such as type of rail equipment, curvature, grade, and superelevation (i.e., cant, camber, or cross slope).

- Limiting speed is a subset of design speed. It is the maximum train speed through the most restrictive curve within a section of the SEHSR project based on current design assumptions.

Limiting speed is used to evaluate the SEHSR R2R rail alternatives in this report. In the absence of average running speed, limiting speed is the most useful measure of how well an alternative meets the need of the proposed project to reduce travel time and improve fuel efficiency.

## PUBLIC HEARINGS

Following publication of the SEHSR R2R Tier II DEIS, DRPT and NCDOT hosted eight public hearings (four in Virginia and four in North Carolina) in July 2010. Public hearing dates and locations are shown in Table 1. The hearings provided an opportunity for members of the public to view the

proposed project designs, ask questions, and provide comments (either orally or via a comment form). The hearings were publicized in newspapers, on the internet, and with direct mailings to owners of properties located within the project study area. Approximate attendance at each of the meetings is also shown in Table 1.



JULY 2010 PUBLIC HEARINGS



**Table 1**  
**Public Hearing Dates and Locations**

Location	Date	Area Served	Attendance
Northside Elementary School, Norlina, NC	July 13, 2010	Warren County, NC	250
Southside VA Community College, Alberta, VA	July 15, 2010	Brunswick and Mecklenburg Counties, VA	183
Virginia DMV Cafeteria, Richmond, VA	July 20, 2010	City of Richmond, VA	193
Union Station, Petersburg, VA	July 21, 2010	City of Petersburg, VA	255
Sunnyside Elementary School, McKenney, VA	July 22, 2010	Dinwiddie County, VA	198
Raleigh Convention Center, Raleigh, NC	July 26, 2010	Wake County, NC	470
Aycock Elementary School, Henderson, NC	July 27, 2010	Vance County, NC	302
Franklinton High School, Franklinton, NC	July 29, 2010	Franklin County, NC	373

## PUBLIC COMMENTS

The public comment period extended from the date of publication of the Tier II DEIS in May 2010 through September 10, 2010. Agencies, organizations, and members of the public supplied comments on the DEIS through letters or emails to NCDOT or DRPT, a project telephone hotline, an internet survey form, or at public hearings (either orally or using a comment form). More than 1,850 individuals and 50 agencies and organizations submitted comments to the project team. Many of the comments were several pages in length, and most covered multiple topics.

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## PROCESS FOR EVALUATING ALTERNATIVES

All comments were read and coded by topic(s) and project section (where identified) to enable sorting. A series of 8 internal decision meetings were held by the project team (NCDOT, DRPT, and consultant staff) to discuss comments received by section. Refer to Table 2 for a listing of the meetings.

At the meetings, impacts to the natural and human environment were evaluated and compared for each alternative, along with information on cost and constructability. All DEIS comments pertaining to a section were reviewed and discussed, and preferences for alternatives were tallied. A decision for each recommended preferred alternative by section was made based on all relevant information. In some sections, additional coordination, analysis, or design work was undertaken prior to making a final recommendation. **This Recommendation Report presents the recommendations that came out of those meetings, along with the basis for the decisions.**

**Table 2**  
**Decision Meeting Dates**

Meeting	Date	Project Sections	Locations
1	December 17, 2010	M, N, O, P, Q, R, S, T	Norlina, Middleburg, Henderson, Kittrell, Franklinton, Youngsville (NC)
2	December 21, 2010	AA, BB, CC	Richmond, Chester, Colonial Heights, Petersburg (VA)
3	January 5, 2011	DD, A, B, C, E, F, H, I, J, K, L	Dinwiddie, McKenney, Alberta, La Crosse (VA)
4	January 14, 2011	U	Wake Forest (NC)
5	January 31, 2011	V (Discussed, decision postponed)	Raleigh (NC)
6	September 9, 2011	D	Brunswick County (VA)
7	November 4, 2011	V	Raleigh (NC)
8	September 28, 2011	G	Brunswick County (VA)

It is important to note that Section 4(f) of the U.S. Department of Transportation Act of 1966 protects publicly owned parks, recreation areas, and wildlife/waterfowl refuges, as well as historic sites listed or eligible for listing in the National Register of Historic Places (NRHP). These lands can only be used for a federally-funded transportation project if there is no other feasible and prudent alternative, and the project incorporates all possible planning to minimize harm. Therefore, in sections of the SEHSR project where a feasible and prudent Section 4(f) avoidance alternative exists, it was recommended as the preferred alternative.

In comments on the DEIS, numerous individuals requested modifications to rail or road designs to reduce impacts to their property or business. These

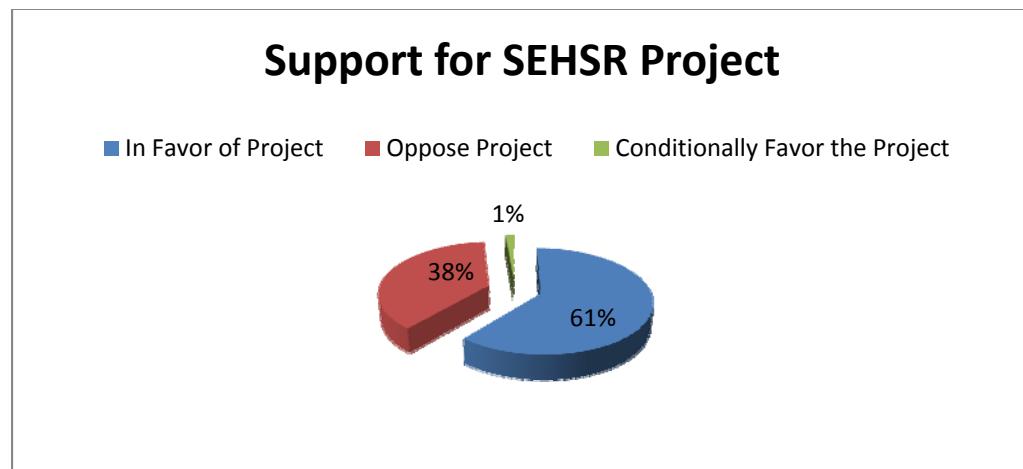
requests were evaluated, and where feasible, will be accommodated in the FEIS. It should be noted the designs presented in the DEIS endeavor to show the “worst case” in terms of impacts because of the absence of detailed survey-level information (i.e., minimization efforts, such as retaining walls, are not always shown because it is not certain the site conditions will allow for them). In final design, efforts will be made to minimize impacts. Additionally, questions pertaining to driveways or property access will be addressed after completion of the ROD, during final design and ROW acquisition.

Many comments did not directly relate to the selection of a preferred alternative, or did not require additional design evaluation. All comments will be fully addressed in the FEIS.

## OVERVIEW OF COMMENTS

Both the comment form provided at the public hearings and the internet survey form polled respondents regarding their favor or opposition to the project, as well as project issues that concern them the most (see Exhibit 2).

Figure 1 displays the level of support for the SEHSR project as indicated on the comment forms. Of the 979 respondents who indicated their favor or opposition to the project, 598 (61%) favor the project, 368 (38%) oppose the project, and 13 (1%) conditionally favor the project (e.g., would support the project if a particular alternative is selected).

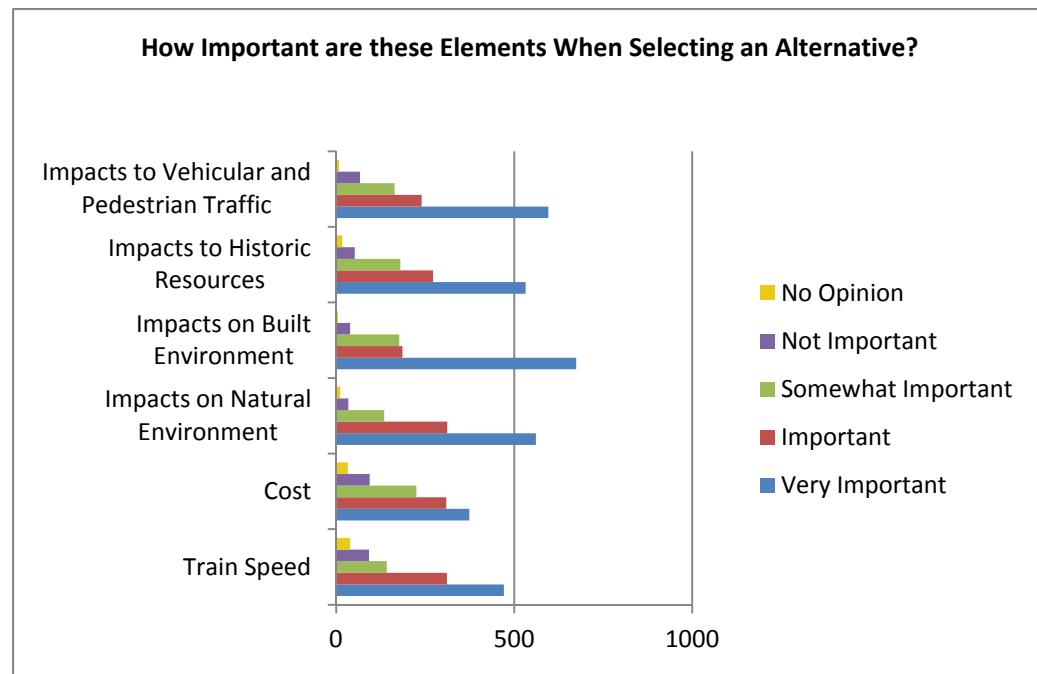


**Figure 1**

Respondents were asked, "How important to you are the following elements in determining which alternative is selected in a given portion of the project?"

Their responses are shown in Figure 2. They were able to select "very important," "important," "somewhat important," "not important," or "no opinion" for the following elements:

- Train speed
- Cost
- Impacts on the natural environment (wetlands, streams, air quality, etc.)
- Impacts on the built environment (homes, towns, businesses, etc.)
- Impacts to historic resources (battlefields, historic districts, etc.)
- Impacts to vehicular and pedestrian traffic (closed crossings, new bridges/overpasses, etc.)



**Figure 2**

Among those who responded, impacts to the natural environment and impacts to the built environment were identified as the most important in alternative selection. For impacts to the natural environment, 873 respondents indicated the issue was “very important” or “important.” For impacts to the built environment, 860 respondents indicated the issue was “very important” or “important.”

## ALTERNATIVE DESCRIPTIONS AND RECOMMENDED ALTERNATIVES

The SEHSR R2R Tier II EIS project applies an “incremental approach” to the development of alternative alignments that were adopted in the SEHSR Tier I EIS. This incremental approach uses existing rail lines or inactive rail corridors (as is the case between Petersburg, VA, and Norlina, NC) where possible, in conjunction with areas of new track, taking advantage of existing rail right of way (ROW) and infrastructure through improvements such as track upgrades, double tracking, additional sidings, curve straightening, train signal improvements, crossing consolidations, and grade separated crossings (i.e., bridge or underpass). This approach upgrades existing railroad ROW to accommodate higher speeds, while avoiding or minimizing impacts to the human and natural environment.

To be considered a viable alternative, a potential alignment was required to meet a variety of design parameters. The maximum design speed for the proposed SEHSR R2R train was established as 110 miles per hour (mph), resulting in an approximate average running speed of 85 to 87 mph. The SEHSR Tier I EIS determined 110 mph to be the optimum high speed based upon benefit/cost, ridership, and current assumption of non-electrified train propulsion. To achieve these objectives, design modifications to existing active and inactive rail alignments were required to straighten curves, adjust the vertical and horizontal alignments, and add passing sidings and new sections of additional track. For these reasons, the proposed alternatives include some new location areas, although the proposed alignments remain predominantly within existing rail corridors for the majority of their length.

The following discussion presents the unique design objectives within the 26 sections of the project given the constraints within each section. In many cases, the need to avoid impacts to historical, community, and natural resources led to the development of alternative alignments. In other cases, the differences in alignment were developed to use existing rail ROW to different extents in order to maximize speeds.

It should be noted that DRTP is currently developing a Richmond to Hampton Roads Passenger Rail Project FEIS that is evaluating high speed passenger service between Richmond, VA, and Norfolk, VA. These improvements are associated with the Richmond to Hampton Roads Extension of the SEHSR corridor. The preferred alignments and impacts described in this Recommendation Report for the rail alignments between Main Street Station in Richmond and the Collier Yard Connection (Sections AA through CC) are expected to apply to the SEHSR extension to Hampton Roads.

## SECTION AA

### SECTION DESCRIPTION

The section begins at Main Street Station in Richmond, VA, and extends to railroad milepost A-11 in Centralia, VA, a distance of 11.31 miles (see Section AA map, Exhibit 3). The SEHSR project corridor follows the CSX S-line in this section, where there is active freight and passenger rail service. The section includes a crossing of the James River and is located entirely within the James River Basin.



RICHMOND MAIN STREET STATION

### DESCRIPTION OF ALTERNATIVES

All alternatives are on common alignment in this section. Exhibit 4 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost. Operability relates to the ability of the alternative to meet the purpose and need for the project.

The section-specific design objectives are to maximize the use of existing ROW and rebuild double tracks where they previously existed (i.e., several areas of this section were reduced to a single track). CSX Transportation (CSX) owns the existing railroad ROW in this section, which supports active freight operations. The MAS (described above) is 79 mph. Slower speeds are proposed in the immediate vicinity of Main Street Station in Richmond.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in this section is the common alignment of Alternatives VA1/VA2/VA3. Henceforth, the recommended preferred alternative for Section AA will be referred to as **Alternative VA1**.

## **SECTION BB**

#### **SECTION DESCRIPTION**

The section begins at railroad milepost A-11 in Centralia, VA, and extends to railroad milepost A-18, just south of Woods Edge Road, a distance of 6.91 miles (see Section BB map, Exhibit 5). There is active freight and passenger rail service in this section. The major population center in Section BB is Chester, VA, and the section passes through Chesterfield County. The section is located entirely within the James River Basin and includes a crossing of Falling Creek.

#### **DESCRIPTION OF ALTERNATIVES**

All alternatives are on common alignment in this section. Exhibit 6 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost. The section-specific design objectives are to maximize the use of existing ROW by installing a new passenger track approximately 30 feet east of existing track. CSX owns the existing railroad ROW, which supports active freight operations. The MAS is anticipated to be 90 mph based on the shared operation of the tracks with CSX.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in this section is the common alignment of Alternatives VA1/VA2/VA3. Henceforth, the recommended preferred alternative for Section BB will be referred to as **Alternative VA1**.

## SECTION CC

### SECTION DESCRIPTION

The section begins at railroad milepost A-18, just south of Woods Edge Road, and extends to Collier Yard at railroad milepost A-27.5, a distance of 8.91 miles (see Section CC map, Exhibit 7). There is active freight and passenger rail service in this section. The major population centers in Section CC are Colonial Heights, VA, and Petersburg, VA. The section includes a new crossing of the Appomattox River, and is located within both the James River Basin and the Chowan River Basin.

### DESCRIPTION OF ALTERNATIVES

All alternatives are on common alignment in this section. Exhibit 8 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost. The section-specific design objectives in this section are to maximize use of existing ROW, minimize travel time through Petersburg, and provide track alignment and layout options for a Petersburg station at one of four potential locations. The station location will be determined through local efforts at a later date, and appropriate environmental documentation will be undertaken at that time. CSX owns the existing railroad ROW in this section, which supports active freight operations. In the middle of the section, the new rail would cross the Appomattox River on a new bridge, parallel to the existing, active bridge. At the southern end of the section (just north of Collier Yard), the new rail would cross over the Norfolk Southern Railroad (NS) N&W Beltline on a bridge adjacent to the existing railroad bridge. The design accommodates, but does not include, a turnout (rail connection) to the N&W Beltline. DRPT is currently constructing a turnout and Beltline connection in this area as part of its plan to provide conventional passenger rail service along the N&W Beltline eastward to the Hampton Roads area. The connection track alignment has been designed and built at the sole expense of DRPT to accommodate the SEHSR project and connection. The limiting speed through Section CC is 80 mph.

### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in this section is the common alignment of Alternatives VA1/VA2/VA3. Henceforth, the recommended preferred alternative for Section CC will be referred to as **Alternative VA1**.

## SECTION DD

### SECTION DESCRIPTION

The section begins at Collier Yard (railroad milepost A-27.5) and extends westward along the inactive Burgess Connector to railroad milepost S-29, a distance of 5.66 miles for Alternatives VA1 and VA3 and 5.63 miles for Alternative VA2 (see Section DD map, Exhibit 9). The tracks have been removed along the Burgess Connector, and small portions of the ROW have been sold for driveway access. Section DD is located primarily in Dinwiddie County, VA, but includes a small area of Petersburg, VA. The section is located within the Chowan River Basin and has no major river crossings.

### DESCRIPTION OF ALTERNATIVES

The section-specific design objectives for all alternatives in this section are to maximize the use of existing rail ROW in the approach to Collier rail yard. The three alternatives are on common alignment except for one area just south of Collier rail yard where they cross over the CSX A-line (main line) to the Burgess Connector to the west. In this area, the alternatives vary in their curvature and the length of the bridge used to cross the A-line. The three variations were developed to address impacts to the Weldon Railroad battlefield (also known as Globe Tavern), which is crossed in this location. The battlefield was determined to be eligible for the NRHP and is protected under Section 106 of the National Historic Preservation Act (NHPA).

Exhibit 10 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives.

Alternative VA1 provides a new track 30 feet east of existing tracks in Collier Yard. It leaves existing ROW as the alignment goes up and over the CSX A-line tracks on a bridge to transition to the CSX Burgess Connector ROW. The limiting speed is 75 mph, and the operability and constructability rating is neutral.

Alternative VA2 provides a new track 30 feet east of existing tracks in Collier Yard and provides a tighter curve than VA1 and VA3, with additional piers on the longest bridge to cross over CSX A-line tracks (compared to VA1 and VA3) in order to minimize ROW needed from Weldon Railroad/Globe Tavern

battlefield. The limiting speed is 70 mph, and the operability and constructability rating is negative. This is due to a skewed angle which requires bridge pilings that will limit future expansion of the CSX A-line; limited access for CSX maintenance; and a lower limiting speed.

Alternative VA3 provides a new track 30 feet east of existing tracks in Collier Yard and provides a shorter bridge over CSX A-line tracks (compared to VA1 and VA2). VA3 also uses a short retaining wall to minimize ROW needed from Weldon Railroad/Globe Tavern battlefield. The limiting speed is 75 mph, and the operability and constructability rating is neutral.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section DD is **Alternative VA3**. Although all three alternatives were recommended to have no adverse effect on the Weldon Railroad/Globe Tavern battlefield during Section 106 coordination, Alternative VA3 (which has the shortest bridge length) is the least visually intrusive to the battlefield. Alternatives VA1 and VA2 would require less ROW from the battlefield, but would have a greater visual impact to the surrounding area. In addition, the ROW required for Alternative VA3 can be landscaped to blend into the surrounding “viewshed.” This determination was validated in coordination with historians from the National Park Service (Petersburg National Battlefield).

Exhibit 10 shows that Alternative VA3 also has fewer stream impacts than Alternative VA2 (and the same as Alternative VA1); the lowest cost; no relocations; and a positive rating for operability and constructability. Alternative VA3 does have slightly greater wetland impacts (less than a quarter acre more), but those impacts will be fully mitigated. There were no public comments expressing a preference for alternatives in this section.

## SECTION A

### SECTION DESCRIPTION

The section begins at railroad milepost S-29 on the inactive Burgess Connector, and extends to the CSX S-line, north of the Dinwiddie community. The CSX S-line is inactive between the Burgess Connector and Norlina, NC. The tracks were removed in 1987; however the ROW remains intact throughout most of the corridor. Alternatives VA1 and VA3 are on common alignment in Section A, with a length of 4.93 miles. Alternative VA2 has a length of 4.95 miles (see Section A map, Exhibit 11). The section is located within the Chowan River Basin and has no major river crossings.

### DESCRIPTION OF ALTERNATIVES

In Section A, the three alternatives are the same except at the transition from the Burgess Connector to the S-line ROW (see Section A map). Exhibit 12 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives.

The section-specific design objectives for Alternatives VA1/VA3 were to maximize the use of existing rail ROW. The limiting speed is 80 mph. The operability and constructability rating is negative. The negative rating stems from sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

The design objectives for Alternative VA2 were to optimize transition speed from the Burgess Connector to the CSX S-line. The limiting speed for Alternative VA2 is 95 mph, and the operability and constructability rating is neutral.

### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section A is **Alternative VA2**.

Alternative VA2 has the fewest wetland and stream impacts; similar impacts to historic resources compared to Alternatives VA1/VA3; a better operability rating; and accommodates higher speeds. There was one comment from the public expressing a preference for VA1/VA3 based on property impacts.

## SECTION B

### SECTION DESCRIPTION

The section begins north of the Dinwiddie community at railroad milepost S-34 and extends southward to railroad milepost S-40 below the Dinwiddie community, a distance of 5.71 miles for Alternatives VA1 and VA3, which are on common alignment, and 5.80 miles for Alternative VA2 (see Section B map, Exhibit 13). The section is located within the Chowan River Basin and has no major river crossings.

### DESCRIPTION OF ALTERNATIVES

Exhibit 14 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternatives VA1/VA3 in this section are to improve train performance by straightening curves. The limiting speed is 110 mph, and the operability and constructability rating is neutral.

The design objective for Alternative VA2 is to maximize the use of existing rail ROW. The limiting speed is 90 mph, and the operability and constructability rating is negative. The negative rating stems from a sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section B is the common alignment of Alternatives VA1/ VA3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative VA1**. Exhibit 14 shows that Alternative VA1 has greater impacts to water resources, forested uplands, and prime and other important farmland; two more residential relocations; and a larger total cost compared to Alternative VA2. However, Alternative VA2 has a much lower limiting speed and a negative rating for operability and constructability. In addition, Alternative VA2 has five more potential noise and vibration impacts (compared to Alternative VA1) and one business relocation (whereas Alternative VA1 has none).

It should be noted that the difference in stream and wetland impacts between the alternatives will be significantly reduced from what was presented in the DEIS. In the DEIS, Alternative VA1 had approximately 450 additional feet of stream impacts and 0.35 acres of wetland impacts compared to Alternative VA2. Of these, more than 300 feet of stream impacts and 0.3 acres of wetland impacts associated with Alternative VA1 are attributed to the proposed new access road that intersects Carson Road. This road will be re-designed in such a way as to minimize or negate the stream and wetland impacts. Any remaining stream and wetland impacts will be fully mitigated, and the design work will include coordination with the US Army Corps of Engineers (USACE). The revised stream and wetland impacts for Alternative VA1 will appear in the FEIS. With these reductions, the stream and wetland impacts for Alternative VA1 will be more in line with Alternative VA2.

There was one public comment expressing a preference for an alternative in this section, specifying a preference for Alternative VA3 with the misunderstanding that it provided a third rail alignment in the section.

## SECTION C

### SECTION DESCRIPTION

The section begins south of the Dinwiddie community at railroad milepost S-40 and ends south of the Nottoway River at railroad milepost S-51, a distance of 10.75 miles (see Section C map, Exhibit 15). The major population center is the Town of McKenney, VA. The section is located in the Chowan River Basin and includes a crossing of the Nottoway River.

### DESCRIPTION OF ALTERNATIVES

All alternatives are on common alignment. The rail is designed to cross the Nottoway River on a single track bridge using existing piers. The section-specific design objective for this section was to maximize the use of existing railroad ROW.

Exhibit 16 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and

cost for the alternatives. The limiting speed is 110 mph, and the operability and constructability rating is neutral.

#### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section C is the common alignment of Alternatives VA1/VA2/VA3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative VA1**. It should be noted that the railroad alignment will be redesigned to include a slight eastward shift away from NRHP boundary for the Zehmer Farm/Honeymoon Hill Farm historic resource. (The boundary listed in the NRHP in 2009 encompasses an area much larger than the area determined to be eligible for the NRHP as part of the SEHSR project surveys in 2005.) This shift should also take the alignment further away from the Town of McKenney's artesian well. The design will be reviewed by the Virginia Department of Historic Resources (VDHR) and coordination with the resource owner will continue. The revised design will be presented in the FEIS.

## SECTION D

### SECTION DESCRIPTION

The section begins south of the Nottoway River at railroad milepost S-51 and extends to north of Alberta, VA, at railroad milepost S-57.5, a distance of 6.07 miles for Alternatives VA1 and VA3, which are on common alignment, and 6.41 miles for Alternative VA2. In response to agency comments, an additional alternative was subsequently developed for this section (Alternative VA4). A description of Alternative VA4 is provided below. The section is located within the Chowan River Basin and has no major river crossings. See Exhibit 17 for a map of Section D.



MICHAUX'S SUMAC

## DESCRIPTION OF ALTERNATIVES

Exhibit 18 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternatives VA1/VA3 in this



WYNNHURST

section are to improve train performance by straightening curves. VA1/VA3 is on new alignment east of the wide curve of the existing rail ROW beginning at the north end of the section, and rejoins the existing ROW just south of Zero Road. At the north end of the section, this alignment would impact a population of an endangered plant species (Michaux's Sumac) and have an adverse effect on the Wynnurst historic property under Section 106 of the NHPA. The alignment would also require a Section 4(f) use of Wynnurst. The limiting speed is 110 mph and the operability and constructability rating is neutral.

The section-specific design objectives for Alternative VA2 in this section are to maximize use of existing rail ROW and to avoid impacts to the historic Wynnurst property and the population of the endangered Michaux's Sumac plant species. The alignment for VA2 impacts more than seven acres of wetlands and 500 more feet of streams compared to Alternatives VA1/VA3. The limiting speed is 110 mph and the operability and constructability rating is neutral.



WETLANDS IN SECTION D

Alternative VA4 was developed after the completion of the public comment period for the DEIS, through coordination and consultation with the USACE, VDHR, US Fish and Wildlife Service (USFWS), and the Virginia Division of Environmental Quality (VDEQ). During discussions with these agencies, it was determined that none of the existing alternatives would satisfy the conflicting concerns of the agencies (endangered species and historic resources on Alternatives VA1/VA3 and wetland impacts on Alternative VA2). The section-specific design objectives for Alternative VA4 in this section were to reduce impacts to wetlands (compared to Alternative VA2), while avoiding a Section

4(f) use of Wynnurst historic resource and impacts to the population of Michaux's Sumac. The limiting speed is 110 mph and the operability and constructability rating is neutral.

A Project Update Meeting was held in Alberta, VA, on July 14, 2011 to provide the public and local officials an opportunity to learn about VA4 in Section D (as well as a newly developed alternative VA4 in Section G). The public was informed that all alternatives were still under consideration, and they were asked to provide comments. Approximately 60 people attended the meeting.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section D is **Alternative VA4**.

Alternative VA4 does not require a Section 4(f) use of the Wynnurst historic property, avoids impacts to the delineated population of the Michaux's Sumac, and minimizes wetland impacts (compared to Alternative VA2). This alternative was determined to be an acceptable preferred alternative by USACE, VDHR, USFWS, and VDEQ at an interagency meeting held on April 12, 2011.

Following the DEIS, six comments were received from the public expressing preference for an alternative: two were in favor of Alternatives VA1/VA3 and four were in favor of Alternative VA2 (based on property impacts). Following the July 2011 Project Update Meeting where Alternative VA4 was introduced, six comments were submitted regarding a preference for an alternative: five comments were in favor of VA4 and one comment was in favor of VA1.

## **SECTION E**

### **SECTION DESCRIPTION**

The section begins north of Alberta, VA, at railroad milepost S-57.5 and extends to south of Alberta at railroad milepost S-62, a distance of 4.21 miles for Alternatives VA1 and VA3, which are on common alignment, and 4.29 miles for Alternative VA2 (see Section E map, Exhibit 19). Alberta is the major population center for the section. The section is located within the Chowan River Basin and has no major river crossings.

## DESCRIPTION OF ALTERNATIVES

Exhibit 20 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost. The section-specific design objectives for Alternatives VA1/VA3 in this section are to improve train performance by straightening curves. The VA1/VA3 design flattens the curve in existing rail ROW near Chestnut Road to a greater degree compared to Alternative VA2, then follows existing rail ROW through the Town of Alberta, VA. The limiting speed is 110 mph, and the operability and constructability rating is positive.

Alternative VA2 straightens the curve north of Alberta, but requires more curvature and alignment length than VA1/VA3. Alternative VA2 is on common alignment with VA1/VA3 on existing rail ROW through the Town of Alberta, VA. The limiting speed is 110 mph, and the operability and constructability rating is neutral.

## RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section E is the common alignment of Alternatives VA1/VA3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative VA1**. Exhibit 20 shows that VA1 has fewer wetland and stream impacts, residential relocations, and vibration impacts when compared to Alternative VA2, as well as a lower cost. Alternative VA1 also has a better operability and constructability rating. There were no public comments expressing a preference for alternatives in this section; however, three comments from regulatory and resource agencies stated a preference for Alternative VA1.

## SECTION F

### SECTION DESCRIPTION

The section begins south of Alberta, VA, at railroad milepost S-62 and ends south of Tower Road at railroad milepost S-66.5, a distance of 4.28 miles (see Section F map, Exhibit 21). The greatest residential density is located at the northern portion of the section in the vicinity of Alberta. The section is located in the Chowan River Basin and there are no major river crossings.

## DESCRIPTION OF ALTERNATIVES

All alternatives are on common alignment in this section. The section-specific design objectives are to maximize the use of existing railroad ROW. Exhibit 22 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost. The limiting speed is 110 mph.

## RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section F is the common alignment of Alternatives VA1/VA2/VA3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative VA1**.

## SECTION G

### SECTION DESCRIPTION

The section begins south of Tower Road at railroad milepost S-66.5 and extends to the Meherrin River at railroad milepost S-70, a distance of 3.61 miles for Alternatives VA1, 3.66 miles for Alternative VA2, and 3.55 miles for Alternative VA3. In response to agency comments and revised information regarding a historic resource, an additional alternative was developed for this section (Alternative VA4). A description of Alternative VA4 is provided below. The existing rail ROW follows a series of sharp reverse (i.e., "S") curves through this section. The section is located within the Chowan River Basin and includes the Meherrin River crossing. See Exhibit 23 for a map of Section G.

## DESCRIPTION OF ALTERNATIVES

Section G has four project alternatives that were designed at various stages of



**OAK SHADES**

the project development process. Initially, Alternative VA1 and Alternative VA2 were developed to straighten the "S" curves through the section while generally following the existing inactive railroad corridor (with Alternative VA2 more closely following the corridor than

Alternative VA1). Subsequent cultural resource

investigations determined that both alternatives would impact the Oak Shades historic resource. Alternative VA3 was developed in an attempt to avoid

impacts to Oak Shades; however, an additional historic resource (the Tourist Guest House) was then identified along the VA3 alignment. Based on this information and comments from the public, Alternative VA4 was developed in an effort to avoid impacts to both Oak Shades and the Tourist Guest House. However, an additional historic resource (the Orgain House) was identified along the VA4 alignment. Given these constraints, it was determined that there is no prudent and feasible way to avoid impacts to at least one historic resource within Section G. The text below provides detailed information about the development of the alternatives and the complexity of the historic resource issues. Exhibit 24 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost.



**TOURIST GUEST HOUSE**

The section-specific design objectives for Alternative VA1 in this section are to improve train performance by straightening curves, but more closely follow the existing rail ROW compared to Alternative VA3. Under Section 106 of the NHPA, Alternative VA1 has no effect on the Tourist Guest House historic property, but has an adverse effect on the Oak Shades historic property. It also requires a use of the Oak Shades resource under Section 4(f). VA1 has a neutral rating for operability and constructability, and the limiting speed is 110 mph.

The design objectives for Alternative VA2 in this section are to improve train performance by straightening curves. Of all the alternatives, it most closely follows the existing rail ROW. Under Section 106 of the NHPA, Alternative VA2



**ORGAIN HOUSE**

has no effect on the Tourist Guest House historic property, but has an adverse effect on the Oak Shades historic property. It also requires a use of the Oak Shades resource under Section 4(f). VA2 has a negative rating for operability and constructability, and the limiting speed is 90 mph. The negative rating stems from a sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which

means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

The section-specific design objectives of Alternative VA3 are to avoid impacts to the Oak Shades historic property and to improve train performance by straightening curves. Alternative VA3 is on new alignment west of the existing rail ROW, and provides the best train performance (compared to Alternative VA1 and Alternative VA2) because it has the straightest alignment through the section. However, it would have an adverse effect on the Tourist Guest House under Section 106 of the NHPA and would require a Section 4(f) use of the resource. (The Tourist Guest House was identified as a historic resource eligible for the NRHP during the development of Alternative VA3.) Alternative VA3 has a positive rating for operability and constructability, and the limiting speed is 110 mph.

After publication of the DEIS there were four comments received from the public expressing preference for an alternative: three people indicated a preference for Alternative VA1, and one person indicated a preference for Alternative VA2.

Alternative VA4 was developed after publication of the DEIS based on discussions with local citizens at the public hearing held in Alberta, VA, on July 15, 2010, and input from resource agencies at an interagency meeting held on September 27, 2010. At the Alberta public hearing, several members of the public expressed concerns about the property impacts associated with Alternative VA3. Although Alternative VA3 would not relocate any residences, it would require substantial ROW acquisition from several large family farms. At the September 27, 2010, agency meeting, USACE and VDEQ expressed concerns that Alternative VA2, which was presented in the DEIS as a possible Section 4(f) avoidance alternative for Section G, had the greatest stream and wetland impacts compared to Alternatives VA1 and VA3. Based on the discussion at this meeting, VDHR requested additional research into the history of the Tourist Guest House to validate the appropriateness of the recommended NRHP-eligible boundary, which at that time encompassed the entire 55-acre tax parcel. On November 17, 2010, VDHR concurred with research completed by the SEHSR project team proposing a smaller eligible

boundary for the Tourist Guest House that only encompasses the areas known to have been used during its period of historic significance. Based on this revised boundary, the SEHSR project team determined that a new alternative could potentially be developed to avoid a Section 4(f) use, minimize property impacts (compared to Alternative VA3), reduce stream and wetland impacts (compared to Alternative VA2), and provide similar train performance to Alternative VA3. Alternative VA4 was the result of this effort. It requires no Section 4(f) use of the Tourist Guest House or Oak Shades historic properties, provides similar train performance compared to Alternative VA3, and is located closer to the rear end of the properties it crosses compared to Alternative VA3. However, it would result in the greatest amount of stream impacts of all of the alternatives and require a Section 4(f) use of the Orgain House (see below). Alternative VA4 has a positive rating for operability and constructability, and the limiting speed is 110 mph.

A Project Update Meeting was held in Alberta, VA, on July 14, 2011, to provide the public and local officials an opportunity to learn about VA4 in Section G (as well as the newly developed alternative VA4 in Section D). The public was informed that all alternatives were still under consideration, and they were asked to provide comments. Approximately 60 people attended the meeting. Following the meeting, four comments were submitted regarding a preference for an alternative: one was opposed to Alternative VA4, while three were in favor of Alternative VA4.

In response to a comment about historic resources received at the Project Update Meeting, additional surveys were completed to ensure all resources eligible for the NRHP were identified within the project corridor in Section G. As a result of those surveys, a new historic resource, the Orgain House, was identified as eligible for the NRHP. It was determined that Alternative VA4 would have an adverse effect on the Orgain House under Section 106 of the NHPA. It would also require a Section 4(f) use of the resource.

It should be noted that the Section 106 effect determination for the Oak Shades property was revised from “no adverse effect” as presented in the DEIS based on additional information and coordination with VDHR. During a review of all project alternatives in October 2011, VDHR noted that although the rail

tracks for VA2 would be located down a steep escarpment from the Oak Shades main house, the rail alignment does not follow the historic location of the railroad and intrudes within the established NRHP-eligible boundary by approximately 100 feet, thus moving the rail bed closer to the historic core of Oak Shades.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section G is **Alternative VA3**.

Through the development of project alternatives, it was determined that there is no prudent and feasible alternative that can avoid a Section 4(f) use of all historic resources. Therefore, a “least overall harm” analysis was completed. This determination is made by balancing the factors listed in 23 CFR 774.3(c):

- i) The ability to mitigate adverse impacts of each Section 4(f) property (including any measures that result in benefits to the property);
- ii) The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- iii) The relative significance of each Section 4(f) property;
- iv) The views of the official(s) with jurisdiction over each Section 4(f) property;
- v) The degree to which each alternative meets the purpose and need for the project;
- vi) After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- vii) Substantial differences in costs among the alternatives.

The following factors were included in the “least overall harm” analysis:

- Alternative VA1 – Section 106 adverse effect and Section 4(f) use of Oak Shades; 654 feet of stream impacts; neutral rating for operability and constructability (operability is related to the ability of the alternative to meet the purpose and need for the project); total cost of \$36.46 million
- Alternative VA2 – Section 106 adverse effect and Section 4(f) use of Oak Shades; 914 feet of stream impacts; negative rating for operability and constructability; total cost of \$29.47 million

- Alternative VA3 – Section 106 adverse effect and Section 4(f) use of Tourist Guest House; 500 feet of stream impacts; positive rating for operability and constructability; total cost of \$36.92 million
- Alternative VA4 – Section 106 adverse effect and Section 4(f) use of Orgain House; 1,095 feet of stream impacts; positive rating for operability and constructability; total cost of \$40.73 million.

Input from the cultural and natural resource agencies was also used to evaluate the alternatives. In a discussion with VDHR on October 11, 2011, it was determined that:

- Alternative VA4 would have the most substantial impact to historic resources (because the main house on the Orgain property is within its construction limits)
- Alternative VA1 would have the second most substantial impact (because it would bring the rail alignment within 50 feet of the main house on the Oak Shades property)
- The impacts of Alternative VA2 (to Oak Shades) and Alternative VA3 (to the Tourist Guest House) can be mitigated. Such mitigation could include landscaping to shield visual impacts.

From a water resources perspective, the resource agencies endorsed Alternative VA3. In a correspondence dated May 25, 2011, VDEQ noted that while they “recognize the problems associated with impacting the Tourist Guest House and/or Oak Shades,” they identified Alternative VA3 as “the least environmentally damaging option that preserves the operational purpose of the project, followed by VA1.” Subsequently, in a letter dated June 29, 2011, USACE stated that they believe Alternative VA3 is the “least environmentally damaging practicable alternative” in Section G and noted that if another alternative was selected, “further avoidance and minimization will have to be incorporated into the project to reduce the impacts to aquatic resources of the selected alternative to a level comparable to or less than those of VA3 in order for [them] to consider authorizing it.”

Based on the above, **Alternative VA3** is the recommended preferred alternative in Section G because it is possible to mitigate the impacts to the Tourist Guest House; the impacts to historic resources are not as severe

(compared to Alternative VA2 and VA4); it minimizes impacts to streams (of all alternatives); and it meets the purpose and need for the project to the greatest degree (compared to Alternatives VA1 and VA2, which do not have positive operability and constructability).

## SECTION H

### SECTION DESCRIPTION

The section begins on the Meherrin River at railroad milepost S-70 and extends to north of Wray Road at railroad milepost S-76, a distance of 5.53 miles for Alternatives VA1 and VA3, which are on common alignment, and 5.58 miles for Alternative VA2 (see Section H map, Exhibit 25). The section is located within the Chowan River Basin and includes a portion of the Meherrin River crossing.

### DESCRIPTION OF ALTERNATIVES

Exhibit 26 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternatives VA1/VA3 are to improve train performance by straightening curves and provide a faster design speed compared to Alternative VA2. The limiting speed is 110 mph, and the operability and constructability rating is positive.

Alternative VA2 also straightens curves, but has more abundant curves compared to Alternatives VA1/VA3. Alternative VA2 is on common alignment with Alternatives VA1/VA3 from near the Brunswick County/Mecklenburg County line, southward to the end of the section. The limiting speed is 110 mph, and the operability and constructability rating is neutral.

### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section H is the common alignment of Alternatives VA1/VA3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative VA1**. Alternative VA1 is the recommended preferred alternative in Section H because it has fewer impacts to streams, prime and important farmland, and forested uplands; along with fewer noise and vibration impacts (Exhibit 26). Although Alternative VA1 has a somewhat higher total cost, the long-term maintenance cost will be lower

compared to Alternative VA2. This is due to the fact that the more abundant curves in the Alternative VA2 create a curvier and longer alignment, which would face greater wear and be more costly to maintain over time. This is reflected in the positive operability and constructability rating for Alternative VA1. There were no public comments indicating a preference for a particular alternative within this section.

## SECTION I

### SECTION DESCRIPTION

The section begins north of Wray Road at railroad milepost S-76 and extends to south of La Crosse, VA, at railroad milepost S-80, a distance of 3.77 miles for all the alternatives (see Section I map, Exhibit 27). The section is located within the Chowan River Basin and the Roanoke River Basin and includes no major stream crossings. The Town of La Crosse, VA, is the major population center for the section.

### DESCRIPTION OF ALTERNATIVES

Exhibit 28 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for all alternatives in this section are to improve train performance by straightening curves.

Alternatives VA1 and VA3, which are on common alignment, avoid a reverse (i.e., "S") curve that is present in the design for Alternative VA2. The limiting speed is 110 mph and the operability and constructability rating is neutral.

In this section, Alternative VA2 is on common alignment with Alternatives VA1/VA3 except for the area north of La Crosse near Northington Road, where Alternative VA2 uses a different design to straighten the curve in the rail alignment. The limiting speed is 110 mph and the operability and constructability rating is neutral.

### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section I is the common alignment of Alternatives VA1/ VA3. Henceforth, the recommended preferred alternative

for this section will be referred to as **Alternative VA1**. Exhibit 28 shows that Alternatives VA1 and VA2 have identical impacts to water resources with nominal stream impacts and no wetlands impacts. However, Alternative VA1 has fewer impacts to prime and important farmland and forested uplands and a lower cost. While Alternative VA1 has six more residential relocations compared to Alternative VA2, there appears to be comparable housing and vacant land available in the vicinity of the displaced residences, so it is anticipated that suitable relocation sites would be identified within the surrounding community. The Commonwealth of Virginia has established a comprehensive program of services and benefits to ensure, to the maximum extent possible, the timely and successful relocation of displacees and reestablishment of businesses per the Virginia Administrative Code, 24VAC30-41. There was one public comment in support of Alternative VA2, and one public comment in support of Alternatives VA1/VA3.

## SECTION J

### SECTION DESCRIPTION

The section begins south of La Crosse, VA, at railroad milepost S-80 and extends to north of Bracey, VA, at railroad milepost S-84, a distance of 3.99 miles for Alternatives VA1 and VA3, which are on common alignment, and 4.10 miles for Alternative VA2 (see Section J map, Exhibit 29). The section is located within the Roanoke River Basin and includes no major stream crossings.

### DESCRIPTION OF ALTERNATIVES

Exhibit 30 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternatives VA1/VA3 are to improve train performance by straightening curves and provide a faster design compared to Alternative VA2. Alternatives VA1/VA3 would have an adverse effect on the Wright Farmstead historic resource under Section 106 of the NHPA and would also require a Section 4(f) use of the property. The limiting speed is 110 mph and the operability and constructability rating is positive.

Alternative VA2 also straightens curves and is designed to avoid impacts to the Wright Farmstead historic property. The limiting speed is 110 mph and the operability and constructability rating is neutral.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section J is **Alternative VA2**.

Alternative VA2 is the Section 4(f) avoidance alternative in this section and minimizes impacts to streams, prime and important farmlands, and forested uplands (see Exhibit 30). Comments from the resource and regulatory agencies indicated a preference for Alternative VA2, while one individual indicated a preference for Alternatives VA1/VA3.

## **SECTION K**

### **SECTION DESCRIPTION**

The section begins north of Bracey, VA, at railroad milepost S-84 and extends to the Roanoke River/Lake Gaston at railroad milepost S-89, a distance of 4.96 miles for Alternatives VA1 and VA3, which are on common alignment, and 4.94 miles for Alternative VA2 (see Section K map, Exhibit 31). The section is located within the Roanoke River Basin and includes the crossing of the Roanoke River.

### **DESCRIPTION OF ALTERNATIVES**

The section-specific design objectives for all alternatives in this section are to improve train performance by straightening curves. Exhibit 32 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives.

Alternatives VA1/VA3 provide a faster design speed compared to Alternative VA2 by straightening curves near Bracey, VA, and avoid impacts to the Bracey Historic District. This alternative would cross the Roanoke River/Lake Gaston in the location of the existing bridge, utilizing the existing bridge piers, pending results of a detailed bridge investigation that would occur prior to final design. The limiting speed is 110 mph and the operability and constructability rating is neutral.

Alternative VA2 also straightens curves near Bracey to achieve improved design speed, but its use of the existing Highway 903 over the railroad results in a design that has a lower limiting speed. Alternative VA2 would have an adverse effect on the Bracey Historic District under Section 106 of the NHPA and would require a Section 4(f) use of the resource. This design would also cross the Roanoke River/Lake Gaston in the location of the existing bridge, utilizing the existing bridge piers, pending results of a detailed bridge investigation that would occur prior to final design. The limiting speed is 100 mph and the operability and constructability rating is negative. The negative rating stems from a sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section K is the common alignment of Alternatives VA1/ VA3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative VA1**. Alternative VA1 is the Section 4(f) avoidance alternative in Section K and minimizes impacts to streams, wetlands, and prime and important farmlands (see Exhibit 32). Alternative VA1 also has a better operability and constructability rating, which would result in lower long-term maintenance for the rails and train equipment compared to Alternative VA2. There was one comment from an individual stating a preference for Alternative VA2.

## **SECTION L**

#### **SECTION DESCRIPTION**

The section begins at the Roanoke River/Lake Gaston bridge (railroad milepost S-89) and extends into North Carolina, ending north of Norlina, NC, at railroad milepost S-95, a distance of 5.75 miles for Alternatives VA1/NC1 and VA3/NC3, which are on common alignment, and 5.96 miles for Alternative VA2/NC2 (see Section L map, Exhibit 33). The section is located within the Roanoke River Basin and includes the crossing of the Roanoke River.

## DESCRIPTION OF ALTERNATIVES

The section-specific design objectives for all alternatives in this section are to improve train performance by straightening curves. Exhibit 34 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives.



LAKE GASTON BRIDGE

Alternative VA1/NC1/VA3/NC3 provides a faster design speed compared to Alternative VA2/NC2 by straightening the large eastward curve of the existing rail that begins just north of the Virginia/North Carolina state line. This alternative avoids impacts to the Granite Hall/Fitts House historic property, which is located in Virginia just north of the North Carolina state line. However, the new alignment for this alternative crosses through a network of stream tributaries before rejoining the existing rail ROW near Wise Five Forks Road. The operability and constructability rating is neutral and the limiting speed is 110 mph.

Alternative VA2/NC2 also straightens curves, but to a lesser degree than Alternative VA1/VA3/NC1/NC3, by maximizing use of the existing rail ROW. The Alternative VA2/NC2 rail alignment stays within existing rail ROW near the Granite Hall/Fitts House historic resource; however, the proposed road realignment and bridge construction along Paschall Road would result in an adverse effect on the property under Section 106 of the NHPA and require a Section 4(f) use of the resource. The operability and constructability rating is negative and the limiting speed is 100 mph. The negative rating stems from a sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed and longer alignment, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

## RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section L is the common alignment of Alternatives VA1/NC1/VA3/NC3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative VA1/NC1**.

Alternative VA1/NC1 is the Section 4(f) avoidance alternative in Section L.

Exhibit 34 shows that Alternative VA1/NC1 has greater stream and wetland impacts compared to VA2/NC2, but fewer impacts to prime and important farmlands, fewer residential relocations, fewer noise and vibration impacts, and a lower total cost. In addition, it has a neutral constructability and operability rating (compared to a negative rating for Alternative VA2/NC2) and has better support from the public. Seven public comments indicated a preference for Alternative VA1/NC1 compared to two for Alternative VA2/NC2.

During project coordination, USACE expressed concerns regarding the greater stream and wetland impacts on Alternative VA1/NC1 (2,809 feet of stream impacts and 0.57 acres of wetland impacts compared to 1,422 feet of stream impacts and 0.01 acres of wetland impacts for Alternative VA2/NC2). In a letter to USACE dated January 6, 2011, the SEHSR project team explained the differences between the alternatives. Based on the information in the letter, as well as previously submitted related information, USACE stated on January 13, 2011, that if the project team assessed that Alternative VA2/NC2 is “not practicable due to residential displacements, cost, and operability, then [USACE] can concur with your assessment based on the information submitted.” Due to residential displacements, cost, and operability, as well as public sentiment, noise and vibration impacts, and impacts to prime and important farmlands, the SEHSR project team finds that Alternative VA2/NC2 is not practicable. The impacts to streams and wetlands will be fully mitigated, and the design work will include coordination with USACE.

## SECTION M

### SECTION DESCRIPTION

The section begins north of Norlina, NC, at railroad milepost S-95 and extends to southwest of Norlina at railroad milepost S-101, a distance of 6.14 miles for Alternatives NC1 and NC3, which are on common alignment, and 5.97 miles for

Alternative NC2 (see Section M map, Exhibit 35). From the Ridgeway community southward to Raleigh, NC, the CSX S-line tracks remain in place and there is active freight service. The section is located within both the Roanoke River Basin and the Tar-Pamlico River Basin and includes no major stream crossings. Norlina, NC, is the major population center in this section.

#### **DESCRIPTION OF ALTERNATIVES**

Exhibit 36 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternatives NC1/NC3 are to improve train performance by straightening curves. At the north end of the section, Alternatives NC1/NC3 are on a common alignment with Alternative NC2 within the existing rail ROW. Alternatives NC1/NC3 leave the ROW to provide a smoother curve at the approach to Norlina, resulting in better train performance compared to Alternative NC2. The operability and constructability rating is neutral and the limiting speed is 110 mph.

The section-specific design objectives for Alternative NC2 are to maximize the use of existing railroad ROW throughout the section, including following more closely the existing curve in the approach to Norlina, NC. The operability and constructability rating is negative and the limiting speed is 80 mph. The negative rating stems from a sharper curvature in the rail alignment which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section M is the common alignment of Alternatives NC1 and NC3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative NC1**. Exhibit 36 shows that Alternative NC1 minimizes stream impacts and has fewer impacts to forested uplands compared to Alternative NC2. Neither alternative would impact wetlands. Alternative NC1 also does not impact a repeater tower that is a contributing element to the Raleigh and Gaston Railroad Corridor (a historic resource protected by Section 106 of the NHPA), whereas Alternative NC2 would require its relocation. In addition, the limiting speed for

Alternative NC1 (110 mph) is 30 mph faster than the limiting speed of Alternative NC2, and Alternative NC1 has a neutral operability and constructability rating compared to a negative rating for Alternative NC2.

Compared to Alternative NC2, Alternative NC1 has the same number of business relocations, one additional residential relocation, and fewer potentially impacted noise receptors. However, Alternative NC1 has a greater number of severely impacted noise receptors and a slightly greater number of structures potentially impacted by vibration compared to Alternative NC2. There were 11 comments received from the public expressing preference for an alternative based on property impacts. Seven people preferred Alternative NC1 and four people preferred Alternative NC2.

## SECTION N

### SECTION DESCRIPTION

The section begins southwest of Norlina, NC, at railroad milepost S-101 and extends to north of Middleburg, NC, at railroad milepost 105, a distance of 3.71 miles for Alternatives NC1 and NC3, which are on common alignment, and 3.77 miles for Alternative NC2 (see Section N map, Exhibit 37). The section is located within both the Roanoke River Basin and the Tar-Pamlico River Basin and includes no major stream crossings.

### DESCRIPTION OF ALTERNATIVES

Exhibit 38 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternatives NC1/NC3 are to improve train performance by straightening a series of curves in the rail ROW beginning near Soul City Boulevard. This alignment has a faster design speed than Alternative NC2, which results in a positive rating for operability and constructability and a limiting speed of 110 mph.

The section-specific design objective for Alternative NC2 was also to improve train performance by straightening the same series of curves in the rail ROW beginning near Soul City Boulevard, but to a lesser degree than Alternative NC1/NC3, by maximizing use of the existing rail ROW. North of this area,

Alternative NC2 shares a common alignment with Alternative NC1. The alignment has a limiting speed of 110 mph and a neutral rating for operability and constructability.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section N is the common alignment of Alternatives NC1 and NC3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative NC1**. Exhibit 38 shows that Alternative NC1 minimizes impacts to streams, prime and important farmlands, and forested uplands compared to Alternative NC2. Alternative NC1 also has fewer residential relocations, fewer potentially impacted noise receptors, and a positive operability and constructability rating. There were no public comments expressing a preference for alternatives in this section.

## **SECTION O**

### **SECTION DESCRIPTION**

The section begins north of Middleburg, NC, at railroad milepost S-105 and extends to the Greystone Quarry north of Henderson, NC, at railroad milepost S-110; a distance of 5.09 miles for Alternative NC1, 5.16 miles for Alternative NC2, and 4.77 miles for Alternative NC3 (see Section O map, Exhibit 39). Middleburg is the major population center for this section. The section is located within both the Roanoke River Basin and the Tar-Pamlico River Basin and includes no major stream crossings.

### **DESCRIPTION OF ALTERNATIVES**

Exhibit 40 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternative NC1 are to improve train performance by straightening curves. Alternative NC1 stays within existing rail ROW through the Town of Middleburg, then swings east to straighten the large curves south of town. Alternative NC1 would require ROW from the Holloway Farm historic property, which is located to the east of these curves. As a result, Alternative NC1 would result in an

adverse effect on the Holloway Farm under Section 106 of the NHPA and would require a Section 4(f) use of the resource. Alternative NC1 has a faster design speed than Alternative NC2, but a slower design speed than Alternative NC3. The limiting speed is 90 mph and the operability and constructability rating is negative. The negative rating stems from a sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

The section-specific design objectives for Alternative NC2 are also to improve train performance by straightening curves, but to a lesser degree than Alternative NC1/NC3. Alternative NC2 is on common alignment with Alternative NC1 through Middleburg. It also shifts to the east to straighten the large curves in the existing rail ROW south of town, although it stays closer to the existing rail ROW than Alternative NC1. Similar to Alternative NC1, Alternative NC2 would result in an adverse effect on the Holloway Farm under Section 106 of the NHPA and require a Section 4(f) use of the resource. Alternative NC2 has the lowest limiting speed of the three alternatives (80 mph), and a negative rating for operability and constructability. The negative rating stems from a sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

The section-specific design objectives for Alternative NC3 were to avoid impacts to the Holloway Farm historic property and improve train performance by straightening curves. Alternative NC3 leaves the existing rail ROW at the north end of the section, traversing to the east of Middleburg and east of the Holloway Farm historic property, before rejoining the existing rail ROW just north of the Greystone Quarry. This alternative has the highest limiting speed (110 mph) and a neutral rating for operability and constructability.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section O is **Alternative NC3**, which is the Section 4(f) avoidance alternative in this section. Exhibit 40 shows that

this alternative also minimizes wetland, noise, and vibration impacts, and has the fewest residential relocations. It does have greater stream and riparian buffer impacts, but those impacts will be fully mitigated, and the design work will include coordination with USACE. Alternative NC3 also had greater public support. Seven people indicated a preference for Alternative NC3, three people preferred Alternative NC1, and one person preferred Alternative NC2.

## SECTION P

### SECTION DESCRIPTION

The section begins north of Henderson, NC, at railroad milepost S-110 and ends north of Kitterell, NC, at railroad milepost S-118, a distance of 7.99 miles (see Section P map, Exhibit 41). The City of Henderson is the major population center in this section. The section is located within both the Roanoke River Basin and the Tar-Pamlico River Basin and there are no major river crossings.

### DESCRIPTION OF ALTERNATIVES

All alternatives are on common alignment in this section. The section-specific design objectives are to maximize the use of existing railroad ROW through Henderson. Exhibit 42 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost. The limiting speed is 80 mph.

### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section P is the common alignment of Alternatives NC1/NC2/NC3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative NC1**.

## SECTION Q

### SECTION DESCRIPTION

The section begins north of Kitterell, NC, at railroad milepost S-118 and extends to the Tar River at railroad milepost S-125.75, a distance of 7.70 miles for Alternatives NC1 and NC3, which are on common alignment, and 7.73 miles for Alternative NC2 (see Section Q map, Exhibit 43). The Town of Kitterell is the

major population center in this section. The section is located in the Tar-Pamlico River Basin and includes the Tar River crossing.

#### **DESCRIPTION OF ALTERNATIVES**

Exhibit 44 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The alternatives are on common alignment throughout most of this section, including through the Town of Kitterell. South of Kitterell, Alternatives NC1/NC3 shifts eastward to straighten a curve while Alternative NC2 follows the curve of the existing railroad.

The section-specific design objectives for Alternatives NC1/NC3 in this section are to improve train performance by straightening curves. Alternatives NC1/NC3 have a neutral operability and constructability rating and the limiting speed is 110 mph.

The section-specific design objectives for Alternative NC2 are to maximize the use of existing railroad ROW. Alternative NC2 has a negative operability and constructability rating and the limiting speed is 90 mph. The negative rating stems from a sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section Q is the common alignment of Alternatives NC1 and NC3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative NC1**.

Exhibit 44 shows that Alternative NC1 has slightly greater impacts to prime and important farmland and forested uplands, and three more residential relocations compared to Alternative NC2, but otherwise the impacts are comparable between alternatives. Based on the lower limiting speed and negative rating for operability and constructability for Alternative NC2, Alternative NC1 is the recommended preferred alternative. There were no public comments expressing a preference for alternatives in this section.

## SECTION R

### SECTION DESCRIPTION



TAR RIVER BRIDGE

The section begins at the Tar River at railroad milepost S-125.75 and extends to north of Franklinton, NC, at railroad milepost S-129, a distance of 3.21 miles for Alternatives NC1 and NC3, which are on common alignment, and 3.23 miles for Alternative NC2 (see Section R map, Exhibit 45). The section is located in the Tar-Pamlico River Basin and includes the Tar River crossing.

### DESCRIPTION OF ALTERNATIVES

Exhibit 46 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternatives NC1/NC3 in this section are to improve train performance by straightening curves. The NC1/NC3 design follows a straighter line east of the curve in the existing rail ROW near Winston Street. The limiting speed is 110 mph and the operability and constructability rating is positive.

The section-specific design objectives for Alternative NC2 are to maximize the use of existing railroad ROW. The NC2 design also straightens the curve in the railroad near Winston Street, but follows the existing rail ROW more closely. NC2 has a neutral rating for operability and constructability and a limiting speed of 110 mph.

### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section R is the common alignment of Alternatives NC1 and NC3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative NC1**. The recommendation is based on the more favorable operability and constructability rating, coupled with a similar degree of impacts to the human and natural environment compared to Alternative NC2. As shown in Exhibit 46, Alternative NC1 would impact approximately 500 fewer feet of streams than Alternative NC2, but would impact more than 10 acres of additional forested uplands and prime and important farmland. There was no difference in public support between alternatives.

It should be noted that Exhibit 46 shows no residential relocations for NC1. However, in straightening the existing railroad curve, the rail alignment shown in the DEIS crosses properties on Cornerstone Drive in a subdivision that was developed after the ROW and relocation reports were completed in 2008. The FEIS will consider a re-designed rail alignment in this location, with a slight westward shift to reduce impacts to residential properties. The revised impacts will also be shown in the FEIS.

## SECTION S

### SECTION DESCRIPTION

The section begins north of Franklinton, NC, at railroad milepost S-129 and extends to north of Youngsville, NC, at railroad milepost S-136, a distance of 6.88 miles for Alternatives NC1 and NC3, which are on common alignment, and 6.71 miles for Alternative NC2 (see Section S map, Exhibit 47). The Town of Franklinton is the major population center of this section. The section is located in the Tar-Pamlico River Basin and includes a crossing of Cedar Creek.

### DESCRIPTION OF ALTERNATIVES

Exhibit 48 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives.

The section-specific design objectives for Alternatives NC1/NC3 in this section are to improve train performance by straightening curves throughout the section. However, the design of Alternative NC1/NC3 does follow the existing railroad through the Town of Franklinton. South of Franklinton, Alternatives NC1/NC3 cross Cedar Creek on a new single track bridge east of the existing railroad bridge. The limiting speed is 95 mph and the operability and constructability rating is neutral.

The section-specific design objectives for Alternative NC2 are to improve train performance by straightening curves throughout the section, utilizing a faster design speed than Alternatives NC1/NC3. This alternative is on common alignment with Alternatives NC1/NC3 through the Town of Franklinton, following the existing rail ROW. South of Franklinton, Alternative NC2 crosses

Cedar Creek on a new single track bridge west of the existing bridge. The limiting speed is 95 mph and the operability and constructability rating is neutral.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section S is the common alignment of Alternatives NC1 and NC3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative NC1**. The recommendation is based on strong public support (267 for Alternative NC1 compared to 3 for Alternative NC2) and a smaller impact to streams. Exhibit 48 shows that overall the alternatives have a similar degree of impacts to the human and natural environment.

## **SECTION T**

#### **SECTION DESCRIPTION**

The section begins north of Youngsville, NC, at railroad milepost S-136 and extends to north of Wake Forest, NC, at railroad milepost S-139, a distance of 2.83 miles for Alternatives NC1 and NC3, which are on common alignment, and 2.96 miles for Alternative NC2 (see Section T map, Exhibit 49). The Town of Youngsville is the major population center of this section. The section is located in both the Tar-Pamlico River Basin and the Neuse River Basin, and includes no major stream crossings.

#### **DESCRIPTION OF ALTERNATIVES**

Exhibit 50 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The section-specific design objectives for Alternatives NC1/NC3 are to improve train performance by straightening curves. All alternatives follow the existing rail ROW on common alignment through the center of Youngsville. The grade of the rail would be lowered through town. South of town, Alternatives NC1/NC3 straighten the wide curve of the existing rail ROW near the industrial development at Nomaco Drive by following a straighter line on new ROW to the west. Alternatives NC1/NC3 have a limiting speed of 110 mph and the operability and constructability rating is neutral.

The section-specific design objectives for Alternative NC2 are to improve train performance by straightening curves, but use more existing rail ROW than Alternatives NC1/NC3. As mentioned above, Alternative NC2 is on common alignment with Alternatives NC1/NC3 through the center of Youngsville. South of town, Alternative NC2 provides some improvement to the wide curve in the existing rail ROW, but stays more closely aligned with the existing rail. The limiting speed is 95 mph and the rating for operability and constructability is negative. The negative rating stems from a sharper curvature in the rail alignment, which means an increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section T is the common alignment of Alternatives NC1 and NC3. Henceforth, the recommended preferred alternative for this section will be referred to as **Alternative NC1**.

Exhibit 50 shows that Alternative NC2 has slightly fewer impacts to streams, riparian buffers, wetlands, farmland and forested uplands than Alternative NC1. However, Alternative NC2 has a lower limiting speed and a negative rating for operability and constructability. Based upon these considerations, Alternative NC1 is the recommended preferred alternative. It should be noted that the greater stream and wetland impacts for Alternative NC1 (approximately 300 feet of stream and less than 0.1 acre of wetlands) are not significant in light of the entire project and will be fully mitigated. Further, there would likely be 100 feet more stream impacts associated with Alternative NC2 as a result of a railroad detour route required during construction, so the effective difference in stream impacts is closer to 200 feet. Alternative NC1 also had greater public support: three people indicated a preference for NC1, while one person preferred NC2.

## SECTION U

### SECTION DESCRIPTION

The section begins north of Wake Forest, NC, at railroad milepost S-139 and extends to north Raleigh, NC (near Gresham Lake), at railroad milepost S-148, a distance of 8.88 miles for Alternative NC1, 8.89 miles for Alternative NC2, and 8.88 miles for Alternative NC3 (see Section U map, Exhibit 51). Wake Forest is the major population center of this section, but the section also includes a populated area of north Raleigh. The section is located in the Neuse River Basin and includes a crossing of the Neuse River.

### DESCRIPTION OF ALTERNATIVES

Exhibit 52 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives. The alternatives are on common alignment through downtown Wake Forest, primarily on existing rail ROW. South of downtown the existing rail follows a series of reverse (i.e., "S") curves. All three alternatives improve train performance by straightening these curves; however, they differ in the way they impact dual constraints posed by a private school to the east, and baseball fields associated with a private sports complex to the west.

The section-specific design objectives for Alternative NC1 are to minimize impacts to the private baseball fields to the greatest extent possible (i.e., provide the needed reduction in rail curvature and without fully avoiding impacts to the private school). The operability and constructability rating is neutral and the limiting speed is 85 mph.

The section-specific design objectives for Alternative NC2 are to minimize impacts to both the private school and the private baseball fields, requiring ROW from both properties. The operability and constructability rating is negative and the limiting speed is 80 mph. The negative rating stems from a sharper curvature in the rail alignment, which means a relative increase in long-term maintenance for the rails and train equipment, and a lower speed, which means an increase in schedule time and fuel use (due to the deceleration and acceleration through the curves).

The section-specific design objectives for Alternative NC3 are to avoid impacts to the private school to the greatest extent possible, but allow greater impacts to the private baseball fields compared to Alternative NC2. The operability and constructability rating is neutral and the limiting speed is 85 mph.

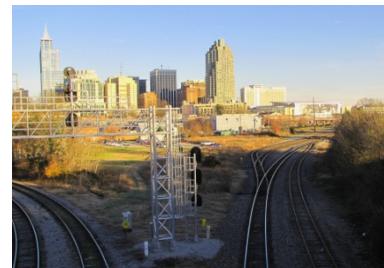
#### RECOMMENDED PREFERRED ALTERNATIVE

The recommended preferred alternative in Section U is **Alternative NC3**. This decision is based primarily on balancing the degree of impacts to the baseball fields and the school. While all three alternatives have some degree of impact on the baseball fields, only Alternative NC3 completely avoids impacts to the school. Exhibit 52 shows that, overall, the three alternatives have a similar level of impacts to the natural and human environment. Although Alternative NC2 minimizes impacts to streams (by approximately 460 feet), as well as to riparian buffers, the impacts for Alternative NC3 are not significant in light of the entire project and will be fully mitigated. Alternative NC3 also has a higher limiting speed and operability and constructability rating compared to Alternative NC2 (and the same as Alternative NC1). There were five public comments that indicated a preference for an alternative in this section: two favored Alternative NC1 (however, the preference was based on a misconception that Alternative NC1 completely avoids impacts to the baseball fields) and three favored Alternative NC2.

## SECTION V

#### SECTION DESCRIPTION

The section begins in north Raleigh, NC, near Gresham Lake at railroad milepost S-148 and extends to the Boylan Wye in downtown Raleigh at railroad milepost S-157.5, a distance of 9.89



BOYLAN WYE

miles for Alternative NC1, 9.91 miles for Alternative NC2, and 9.97 miles for Alternative NC3. (A “wye” is a triangle-shaped arrangement of railroad tracks with a switch at each corner that allows for trains to pass from one line to another or can be used for trains to reverse direction.) In response to the many comments received for Section V, a new rail alternative was subsequently developed to provide an alternative

alignment for the downtown area: Alternative NC5. A description of NC5 is provided below. Raleigh is the major population center of this section. The section is located in the Neuse River Basin and includes a crossing of Crabtree Creek. See Exhibit 53 for a map of Section V and Exhibit 54 for a map of downtown Raleigh.

#### **DESCRIPTION OF ALTERNATIVES**

Exhibit 55 displays information regarding impacts to the human and natural environment, as well as information about operability, constructability, and cost for the alternatives presented in the DEIS (NC1, NC2, and NC3) for the entire section. Exhibit 56 displays the same categories of information for the downtown Raleigh area between Whittaker Mill Road and the Boylan Wye for all the alternatives, including the newly developed alternative NC5. The section-specific design objectives for Alternatives NC1 and NC2 are to maximize the use of existing CSX rail ROW through downtown Raleigh. There are minor differences between the NC1 and NC2 road and rail alignments near the Boylan Wye. The differences reflect alternative approaches to facilitating the movement of freight traffic through the wye. Both NC1 and NC2 have a limiting speed of 45 mph, and a negative operability and constructability rating. The negative rating is due to the fact that the designs create a permanent at-grade crossing between passenger and freight operations at Edgeton (near Whittaker Mill Road) and require SEHRS passenger trains to share tracks with active freight yard switching. Such at-grade crossings and shared use in the vicinity of the yard are not desirable from because significant delays can occur to the freight and passenger trains due to overlapping operations. In addition, Alternatives NC1 and NC2 require a reconfiguration of the CSX Capital Yard to avoid conflicts with proposed Triangle Transit light rail tracks on the east.

The section-specific design objectives for Alternative NC3 are to respond to a request by the City of Raleigh to minimize disruption of traffic and pedestrian patterns in the congested area around Jones Street and Glenwood South presented by Alternatives NC1 and NC2. The alternative is common with Alternatives NC1, NC2, and NC5 north of downtown. Through downtown, Alternative NC3 uses both NS ROW (from south of Whitaker Mill Road to Jones

Street) and CSX ROW (south of Jones Street). Alternative NC3 has a limiting speed of 45 mph, and a positive rating for operability and constructability.

Following the DEIS and public hearing, there were 320 comments received from the public expressing preference for an alternative in Section V: 188 preferred Alternative NC1; 57 preferred Alternative NC2; and 75 preferred Alternative NC3. Additionally, an iterative series of alternative design proposals (dubbed “NC4” and “hybrid”) were submitted by citizens during the public comment period. The intent was to find a way to combine aspects of Alternatives NC1, NC2, and NC3 in a way that would minimize impacts to neighborhoods, the downtown area, and the freight railroad yards. Based on concerns expressed by members of the public, community organizations, and NS about the potential impacts of Alternative NC3, the Raleigh City Council held a public hearing on September 1, 2010, to hear from the public and ask additional questions of the SEHSR project team. The hearing was attended by more than 200 people. Afterward, the City Council requested that NCDOT analyze the possibility of developing a “hybrid” approach through downtown Raleigh.

The “hybrid” designs proposed by the public were given careful consideration, but were not feasible from an engineering perspective. However, the general concept of these proposals led to the development of Alternative NC5, which follows CSX ROW from Whitaker Mill Road southward (similar to Alternatives NC1 and NC2, but with the SEHSR rail on the west side of the existing CSX tracks, further from residential areas, and grade separated with NS). The alternative crosses Capital Boulevard on a new bridge (near Wade Avenue) and then continues south to Jones Street adjacent to the NS tracks but on separate ROW (similar to Alternative NC3, but with the SEHSR rail on the east side of the existing NS tracks, further from residential areas). South of Jones Street, Alternative NC5 follows CSX ROW similar to the other project alternatives. Alternative NC5 is common with Alternatives NC1, NC2, and NC3 north of downtown. Alternative NC5 provides the benefit of avoiding both the CSX Capital Yard and the NS Glenwood Yard, which minimizes impacts to freight operations in downtown Raleigh. It also avoids impacts to the Raleigh Electric Company Power House and Carolina Power and Light Company Car Barn historic properties (which would be impacted by Alternatives NC1 and NC2)

and the Roanoke Park Historic District (which would be impacted by Alternative NC3). Alternative NC5 has a limiting speed of 45 mph, and a positive rating for operability and constructability.

A Project Update Meeting was held in Raleigh, NC, on September 27, 2011, to provide the public an opportunity to learn about NC5 in downtown Raleigh between Whitaker Mill Road and the Boylan Wye. Because all alternatives are on common alignment through Section V north of Whitaker Mill Road, the review was limited to the changes through downtown Raleigh. In the weeks preceding the Project Update Meeting, a preliminary review of NC5 was provided to members of the City of Raleigh's Passenger Rail Task Force, the City Council, and state legislators representing the area. Local government officials and members of the public were informed that all alternatives were still under consideration, and they were asked to provide comments.

Approximately 212 people attended the Project Update Meeting.

#### **RECOMMENDED PREFERRED ALTERNATIVE**

The recommended preferred alternative in Section V is **Alternative NC5**. This decision is based on the fact that it minimizes impacts to neighborhoods, freight operations, and historic resources, and was endorsed by the Raleigh City Council on October 4, 2011. Exhibit 56 shows that NC5 has the least impacts to streams, no residential relocations, fewer business relocations compared to NC3 (but greater than NC1 and NC2), and only one severely impacted noise receptor (compared to 40 for the other alternatives). Additionally, apart from the impact to the historic Raleigh and Gaston Railroad Corridor that is common among all alternatives, Alternative NC5 has no additional impacts to historic resources. Each of the other alternatives (NC1, NC2, and NC3) would have an adverse effect on at least one resource protected under Section 106 of the NHPA, and also require a Section 4(f) use of those properties.

NC5 is also favored by the public. Following the Project Update Meeting, 61 comments were submitted by the public expressing preference for an alternative: three were in favor of NC1 (with no specific reason stated); three were in favor of NC2 (based partially upon cost considerations); three were in favor of NC3 (based upon rail designs, interaction with freight railroads, and

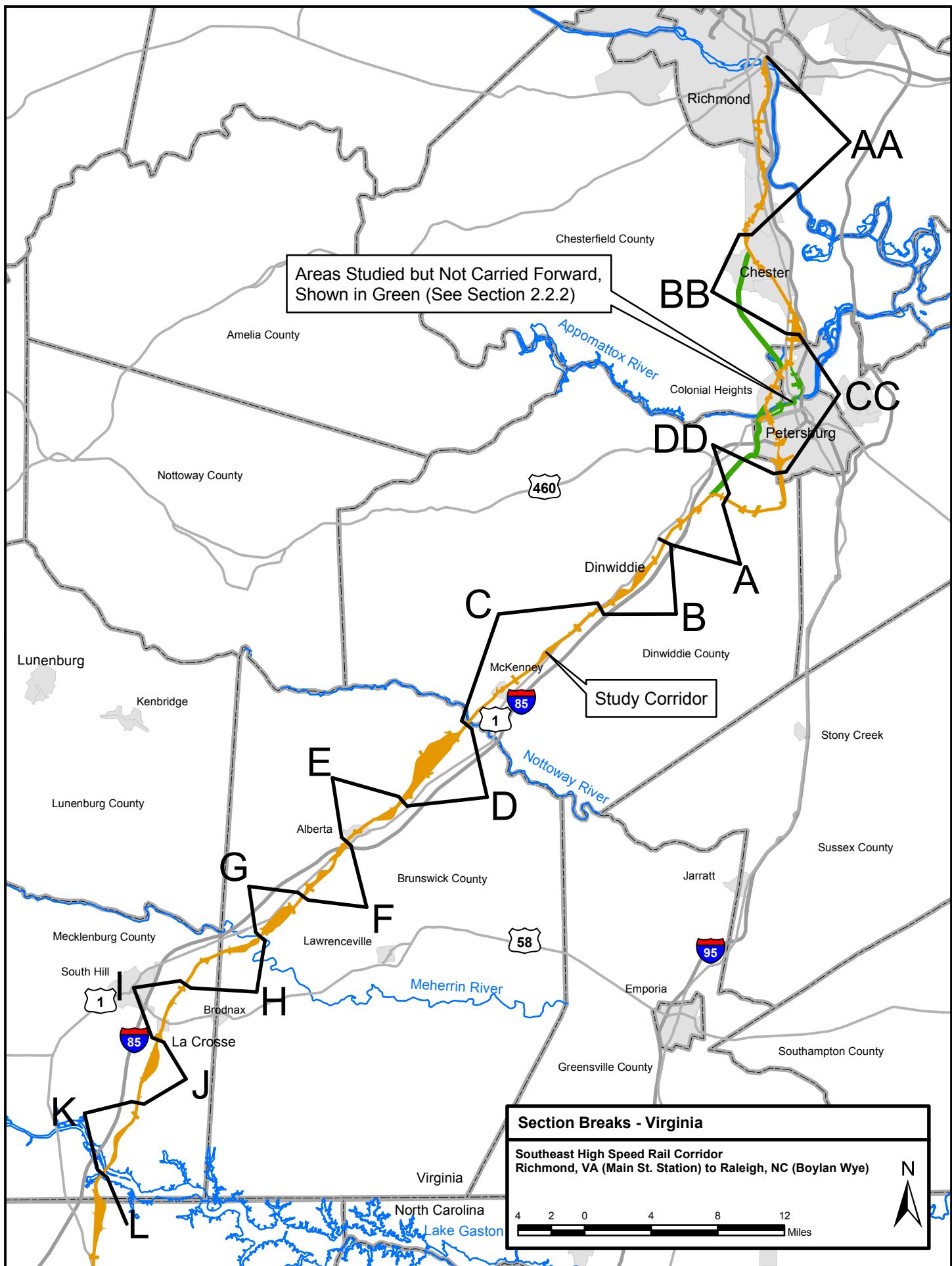
downtown connectivity); while 52 expressed a preference for NC5 (based primarily upon minimized impacts to neighborhoods, freight operations, and historic resources).

## ACRONYMS

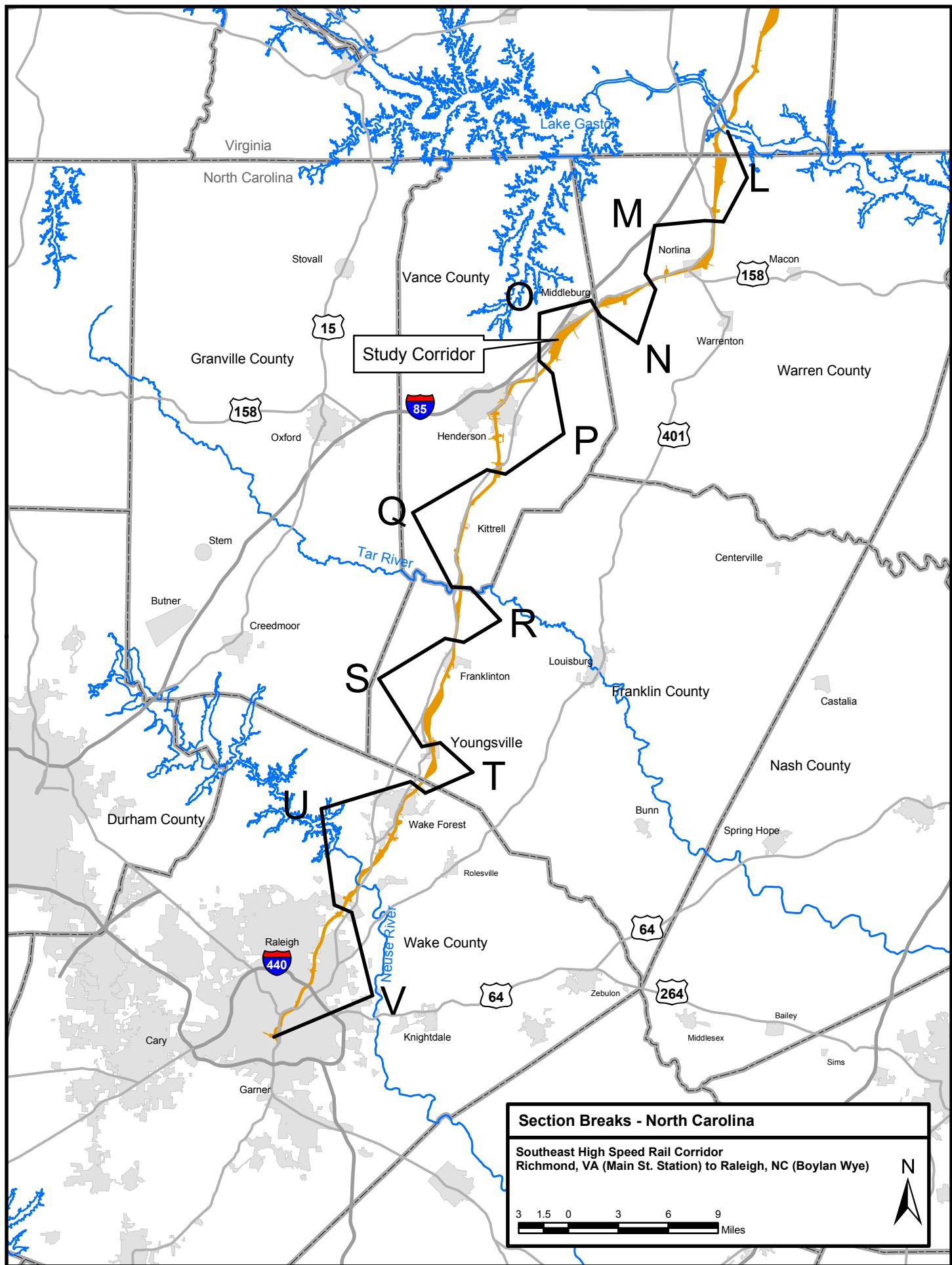
CSX	CSX Transportation
DEIS	Draft Environmental Impact Statement
DRPT	Department of Rail and Public Transportation
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
HSR	high speed rail
MAS	maximum authorized speed
mph	miles per hour
NCDOT	North Carolina Department of Transportation
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NS	Norfolk Southern Railroad
ROD	Record of Decision
ROW	right of way
SEHSR	Southeast High Speed Rail
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
VDEQ	Virginia Division of Environmental Quality
VDHR	Virginia Department of Historic Resources

## EXHIBITS

Exhibit 1



## Exhibit 1 (Continued)



# Public Comment Sheet

*Due by September 10, 2010*

Your opinion is important to us! Please use this survey to provide comments on the Tier II Draft Environmental Impact Statement for the section of the Southeast High Speed Rail (SEHSR) from Richmond, VA, to Raleigh, NC. You may also submit your comments online by visiting the project website: [www.sehsr.org](http://www.sehsr.org).

Please tell us about yourself. Only your zip code is required; however, providing your contact information will allow us to respond to any questions or concerns you raise and provide you with updates on the project. PLEASE PRINT

First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_ Company/Organization: \_\_\_\_\_  
 Street Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \* \_\_\_\_\_  
 Email Address: \_\_\_\_\_ \* Required Information

**1.** Check the box for the project Section (AA-V) you are commenting on. Please check only one box. Additional comment space is provided at the end, if you wish to comment on more than one Section.

No Specific Section	AA	BB	CC	DD	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V

**2.** How important to you are the following elements in determining which alternative is selected in a given section of the project? Please check only one answer per line.

Elements	Very Important	Important	Somewhat Important	Not Important	No Opinion
Train speed					
Cost					
Impacts on the natural environment (wetlands, streams, air quality, etc.)					
Impacts on the built environment (homes, towns, businesses, etc.)					
Impacts to historic resources (battlefields, historic districts, etc.)					
Impacts to vehicular and pedestrian traffic (closed crossings, new bridges/overpasses, etc.)					

**3.** In the section you are commenting on, which alternative do you prefer?

VA1	VA2	VA3	No Preference

**4.** Provide additional comments in the space provided below. First, identify the topics your comments address. Check all that apply.

Topics
Train speed/equipment
Impacts to natural resources (streams, wetlands, air quality, etc.)
Impacts to the built environment (homes, towns, businesses, etc.)
Impacts to historic resources (battlefields, historic districts, etc.)
Re-routing of vehicle or pedestrian traffic
Visual changes associated with the project
Ridership
Preference for an alternative
Other

(Continues on other side)

**5.** In general, are you:

In favor of the project	Opposed to the project

Please place this form in the comment box at the public hearing, or return by mail by Sept. 10, 2010. To send by mail, fold where noted and adhere with tape and add a stamp.

fold

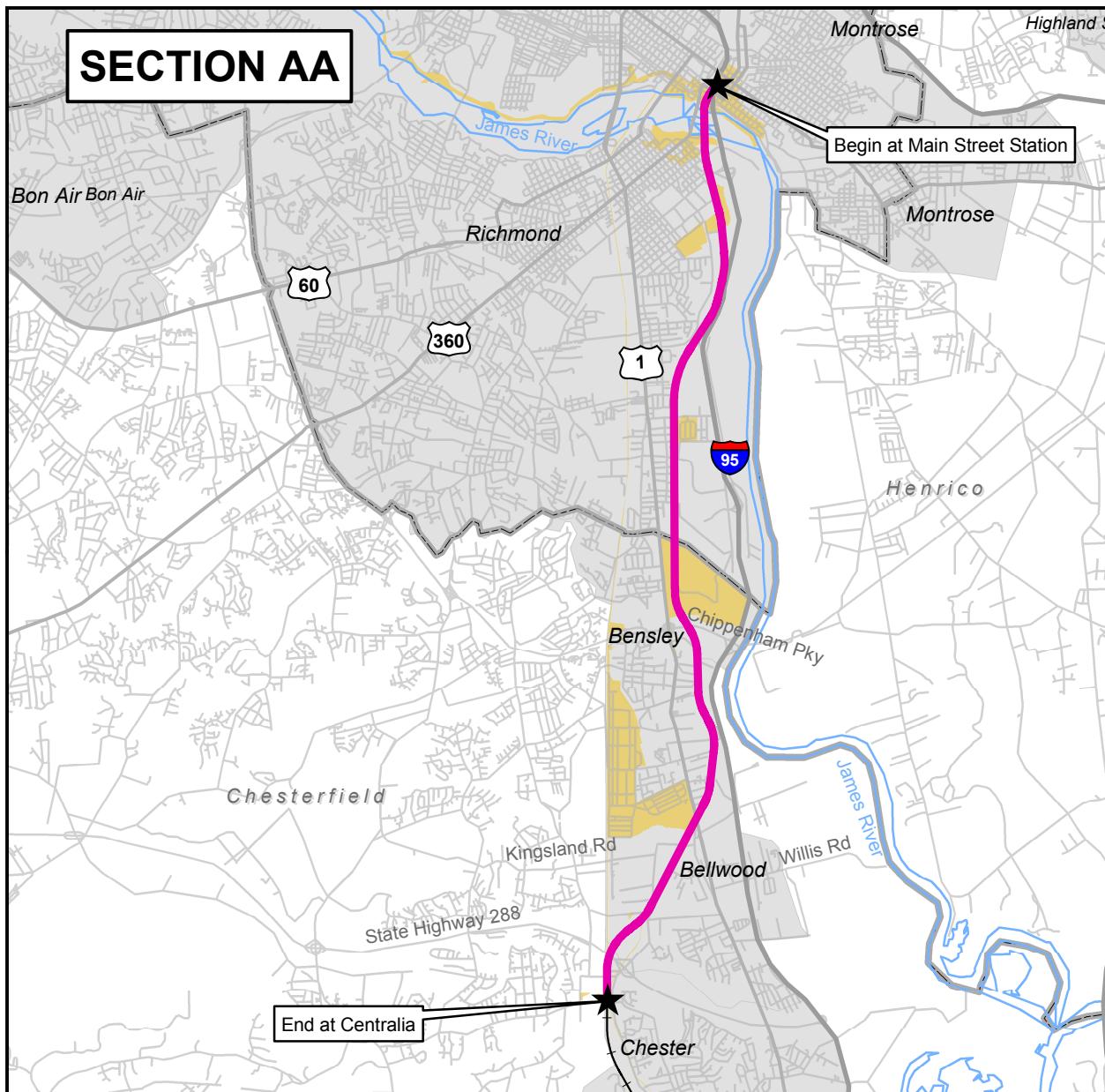
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U.S. Postage  
Required

Public Information Office  
Virginia Department of Rail and Public Transportation  
600 East Main Street, Suite 2102  
Richmond, VA 23219



Exhibit 3



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative VA1\*      ■ Historic Resources (Architectural)

— Existing Rail Corridor

— Rivers

■ County Boundary

■ Municipal Boundary

\* All alternatives were common in this section

0 1 2 Miles



## Exhibit 4

### Section AA- All Alternatives on Common Alignment

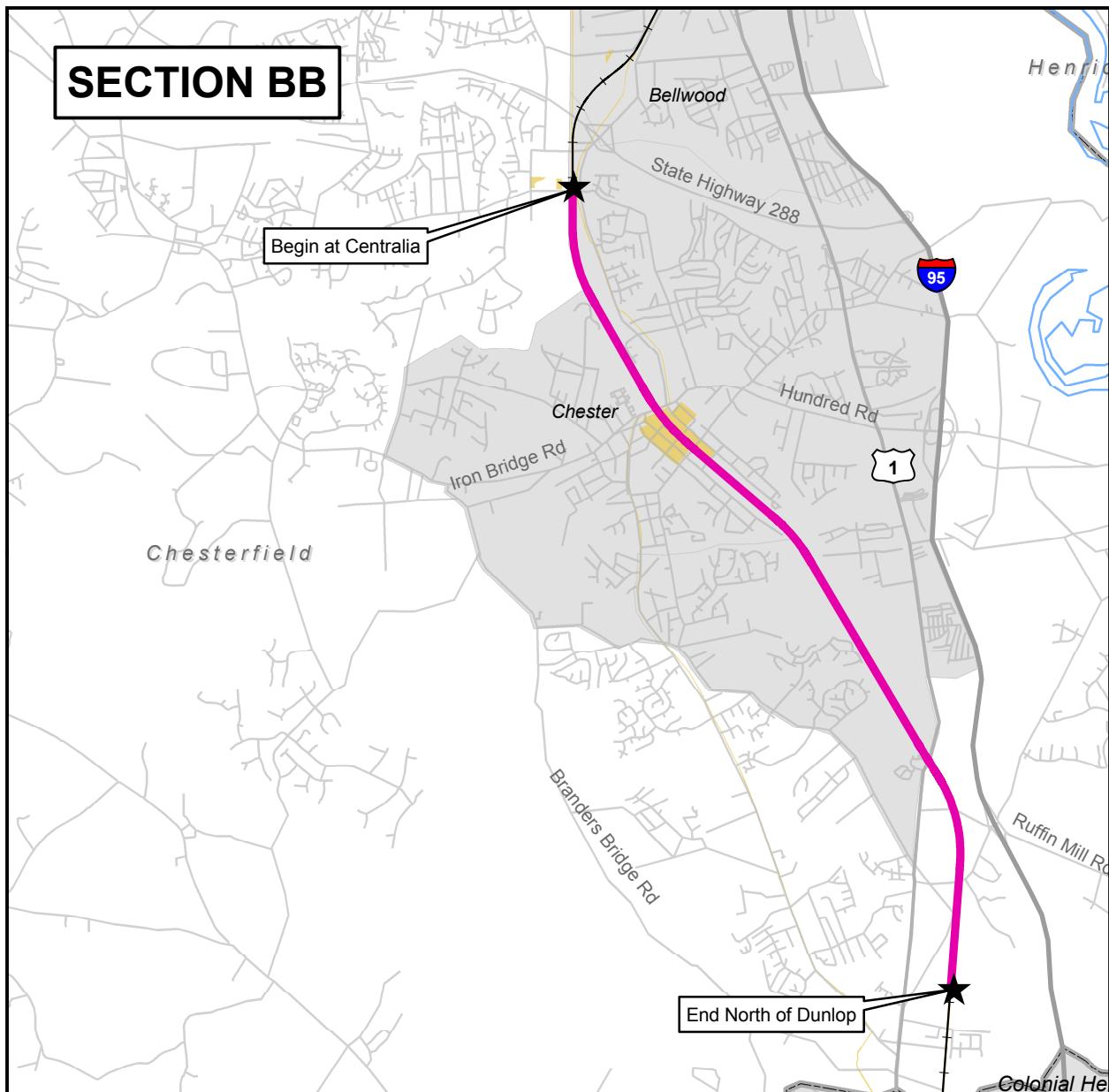
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION AA			Topic	SECTION AA		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	11.31	11.31	11.31
Number of Stream Crossings	20	20	20	Limiting Speed**	N/A	N/A	N/A
Impacts to Streams (linear feet)	4,518	4,518	4,518	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	2.88	2.88	2.88	Roadwork (miles)	4.60	4.6	4.6
FEMA Floodplain Crossings	18	18	18				
Federal/State Designated Rivers (crossings)	1	1	1				
Impacts to Prime and Other Important Farmland (acres)	26.16	26.16	26.16				
Forested uplands (acres)	43.7	43.7	43.7	Rail and Road Construction Cost (millions \$)	191.6	\$191.60	\$191.60
Hazardous Materials Sites	59	59	59	Utility Relocation Cost (millions \$)	20.47	\$20.47	\$20.47
Residential Relocations	40	40	40	Right-of-Way Cost (millions \$)	28.11	\$28.11	\$28.11
Business Relocations	6	6	6	<b>TOTAL COSTS</b> (millions \$)	240.18	\$240.18	\$240.18
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	0	0	0				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	1	1	1				
Section 4(f) Uses- Historic *	1	1	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	9	9	9				
Section 4(f) De Minimis- Parks *	2	2	2				
Section 106 Adverse Effects *	1	1	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 5



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

<b>Recommended Preferred Alternative VA1*</b>	<b>Historic Resources (Architectural)</b>
<b>Existing Rail Corridor</b>	<b>County Boundary</b>
<b>Rivers</b>	<b>Municipal Boundary</b>

\* All alternatives were common in this section



## Exhibit 6

### Section BB- All Alternatives on Common Alignment

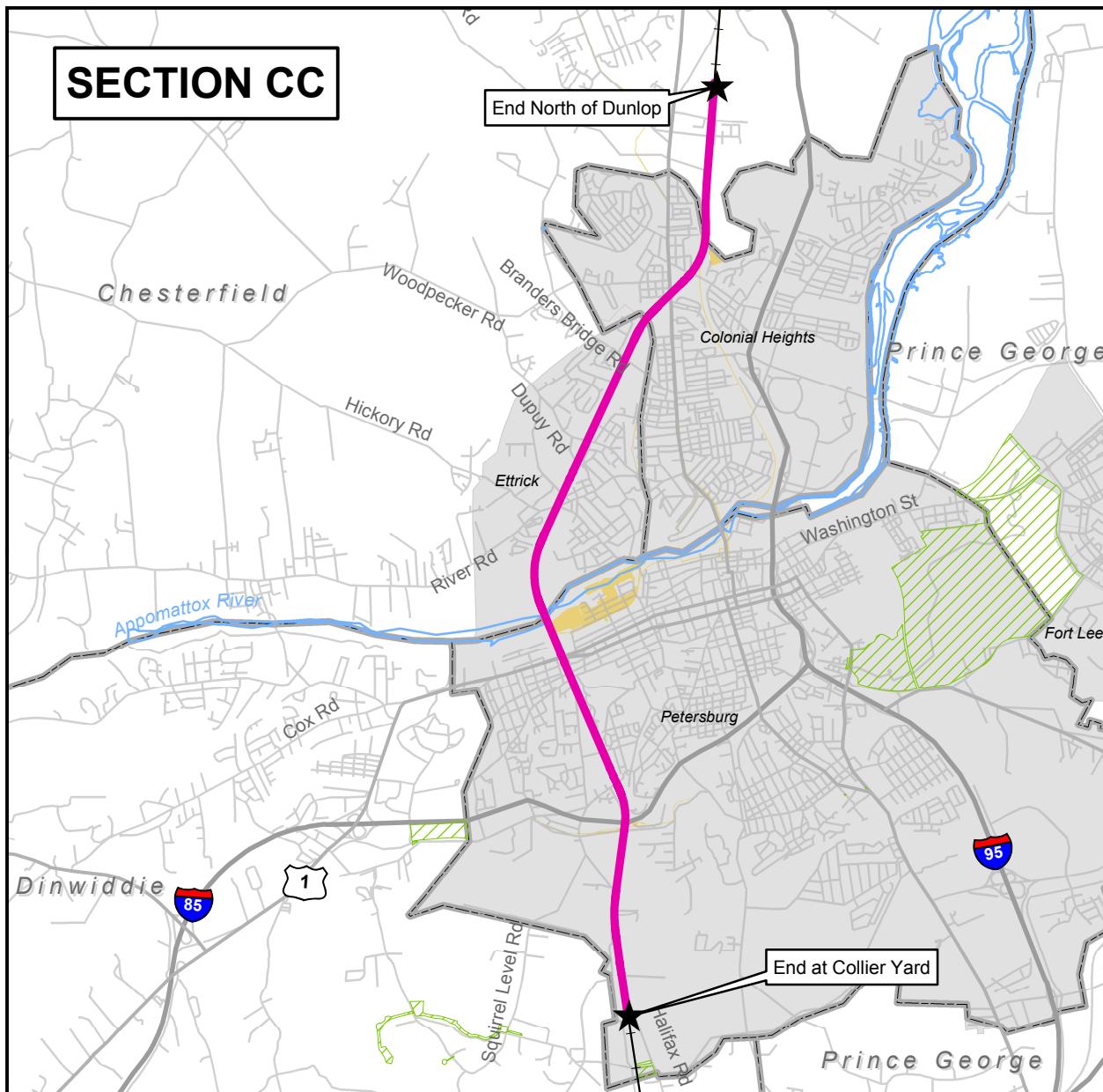
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION BB			Topic	SECTION BB		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	6.91	6.91	6.91
Number of Stream Crossings	17	17	17	Limiting Speed**	N/A	N/A	N/A
Impacts to Streams (linear feet)	2,991	2,991	2,991	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	4.53	4.53	4.53	Roadwork (miles)	2.2	2.2	2.2
FEMA Floodplain Crossings	7	7	7				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	12.59	12.59	12.59				
Forested uplands (acres)	57.39	57.39	57.39	Rail and Road Construction Cost (millions \$)	\$70.40	\$70.40	\$70.40
Hazardous Materials Sites	10	10	10	Utility Relocation Cost (millions \$)	\$3.87	\$3.87	\$3.87
Residential Relocations	6	6	6	Right-of-Way Cost (millions \$)	\$11.04	\$11.04	\$11.04
Business Relocations	1	1	1	<b>TOTAL COSTS</b> (millions \$)	\$85.31	\$85.31	\$85.31
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	0	0	0				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	2	2	2				
Section 4(f) Uses- Historic *	2	2	2				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	6	6	6				
Section 4(f) De Minimis- Parks *	1	1	1				
Section 106 Adverse Effects *	4	4	4				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is not used to evaluate alternatives in Section BB because the maximum authorized speed is anticipated to be 90 mph.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 7



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA1\*
- Existing Rail Corridor
- Rivers
- Fort Wadsworth Unit of Petersburg Nat'l Battlefield
- Historic Resources (Architectural)
- County Boundary
- Municipal Boundary

\* All alternatives were common in this section



## Exhibit 8

### Section CC- All Alternatives on Common Alignment

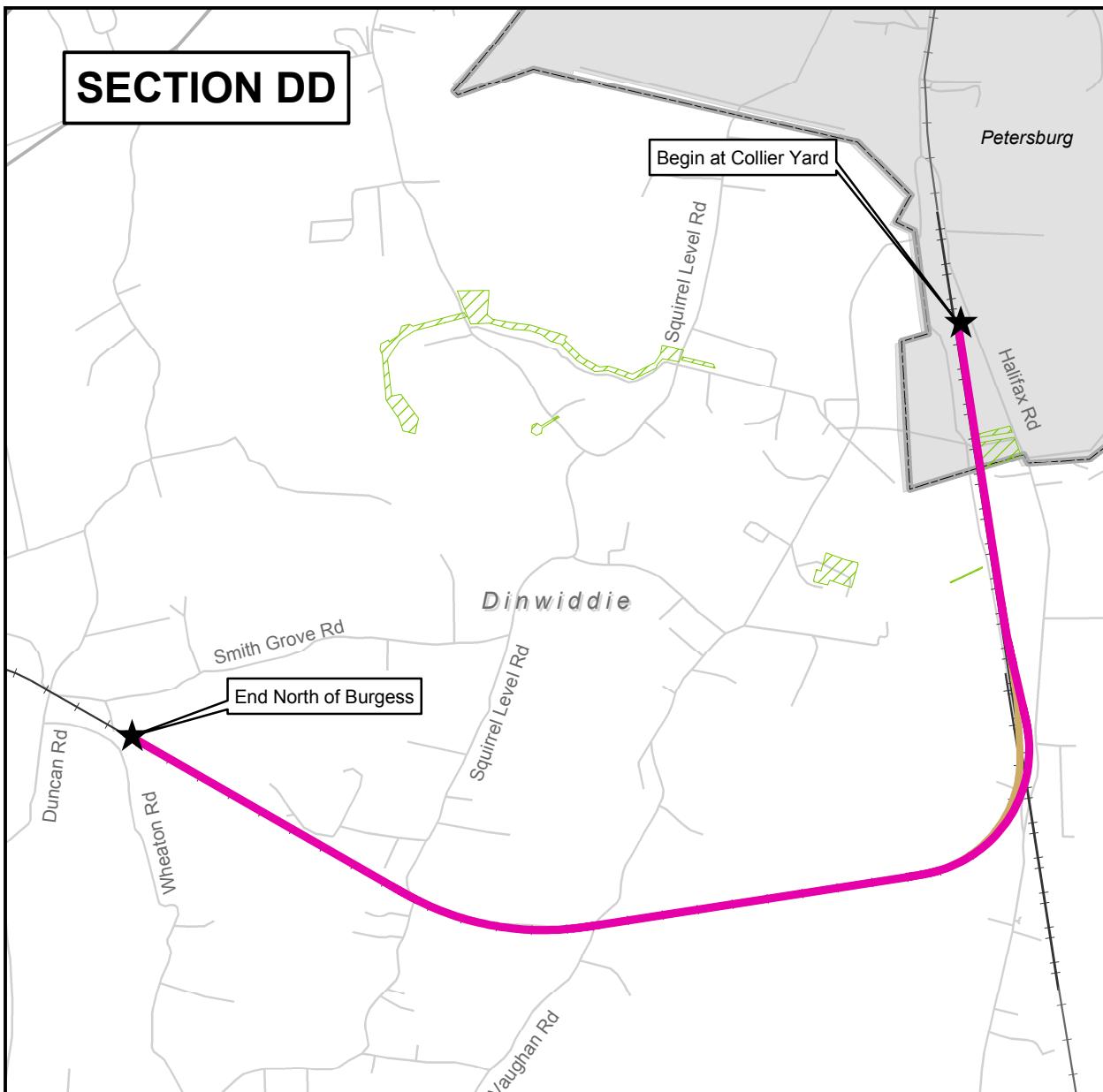
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION CC			Topic	SECTION CC		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	8.91	8.91	8.91
Number of Stream Crossings	18	18	18	Limiting Speed**	80	80	80
Impacts to Streams (linear feet)	2,047	2,047	2,047	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	5.21	5.21	5.21	Roadwork (miles)	3.8	3.8	3.8
FEMA Floodplain Crossings	7	7	7				
Federal/State Designated Rivers (crossings)	1	1	1				
Impacts to Prime and Other Important Farmland (acres)	57.56	57.56	57.56				
Forested uplands (acres)	51.64	51.64	51.64	Rail and Road Construction Cost (millions \$)	\$113.20	\$113.20	\$113.20
Hazardous Materials Sites	20	20	20	Utility Relocation Cost (millions \$)	\$4.49	\$4.49	\$4.49
Residential Relocations	44	44	44	Right-of-Way Cost (millions \$)	\$26.14	\$26.14	\$26.14
Business Relocations	1	1	1	<b>TOTAL COSTS</b> (millions \$)	\$143.83	\$143.83	\$143.83
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	11	11	11				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	15	15	15				
Section 4(f) Uses- Historic *	3	3	3				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	9	9	9				
Section 4(f) De Minimis- Parks *	3	3	3				
Section 106 Adverse Effects *	3	3	3				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 9



### Southeast High Speed Rail, Richmond, VA to Raleigh, NC

- Recommended Preferred Alternative VA3\*
- Alternative VA2
- existing rail corridor
- Rivers
- ▨ Fort Wadsworth Unit of Petersburg Nat'l Battlefield
- Historic Resources (Architectural)
- ▨ County Boundary
- ▨ Municipal Boundary

\* Alternative VA1 was on the same alignment as VA3 in this section but required a longer bridge over the CSX A-line south of Collier Yard



## Exhibit 10

### Section DD- Alternatives VA1, VA2, VA3 on Different Alignments

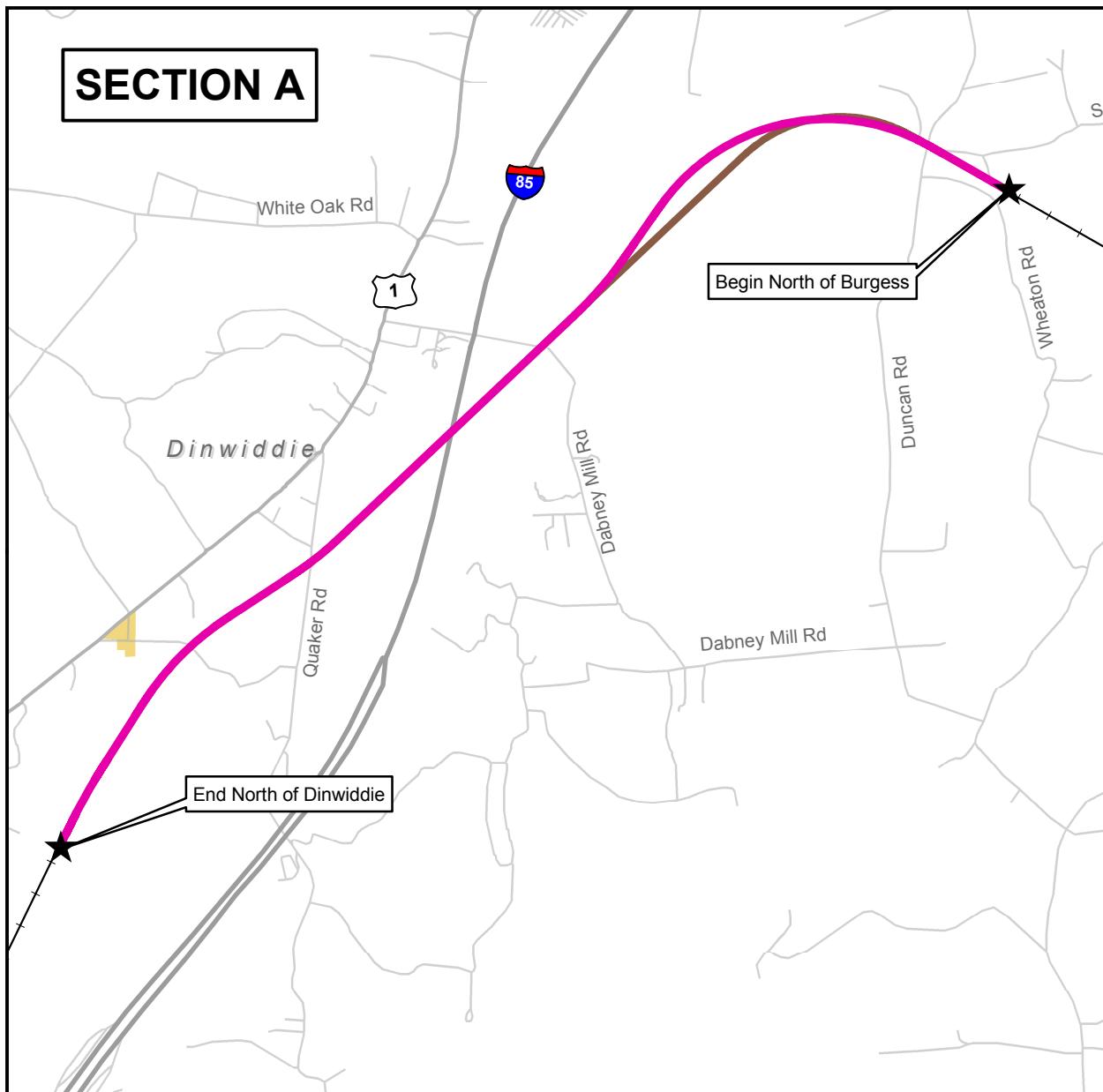
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION DD			Topic	SECTION DD		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	5.66	5.63	5.66
Number of Stream Crossings	6	6	6	Limiting Speed**	75	70	75
Impacts to Streams (linear feet)	720	739	720	Operability/Constructability***	neutral	negative	positive
Impacts to Wetlands (acres)	2.28	2.19	2.32	Roadwork (miles)	1.5	1.5	1.5
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	23.45	22.82	32.74				
Forested uplands (acres)	53.14	53.46	59.36	Rail and Road Construction Cost (millions \$)	\$77.10	\$76.90	\$57.60
Hazardous Materials Sites	1	1	1	Utility Relocation Cost (millions \$)	\$2.59	\$2.41	\$2.42
Residential Relocations	2	0	0	Right-of-Way Cost (millions \$)	\$2.72	\$2.66	\$2.45
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$82.41	\$81.97	\$62.47
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	0	0	0				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	0	0	0				
Section 4(f) Uses- Historic *	0	0	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	5	5	5				
Section 4(f) De Minimis- Parks *	1	1	1				
Section 106 Adverse Effects *	0	0	0				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 11



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA2
- Alternatives VA1/VA3
- Existing Rail Corridor
- Rivers
- Historic Resources (Architectural)
- Municipal Boundary
- County Boundary



## Exhibit 12

### Section A- Alternatives VA1, VA3 on Common Alignment

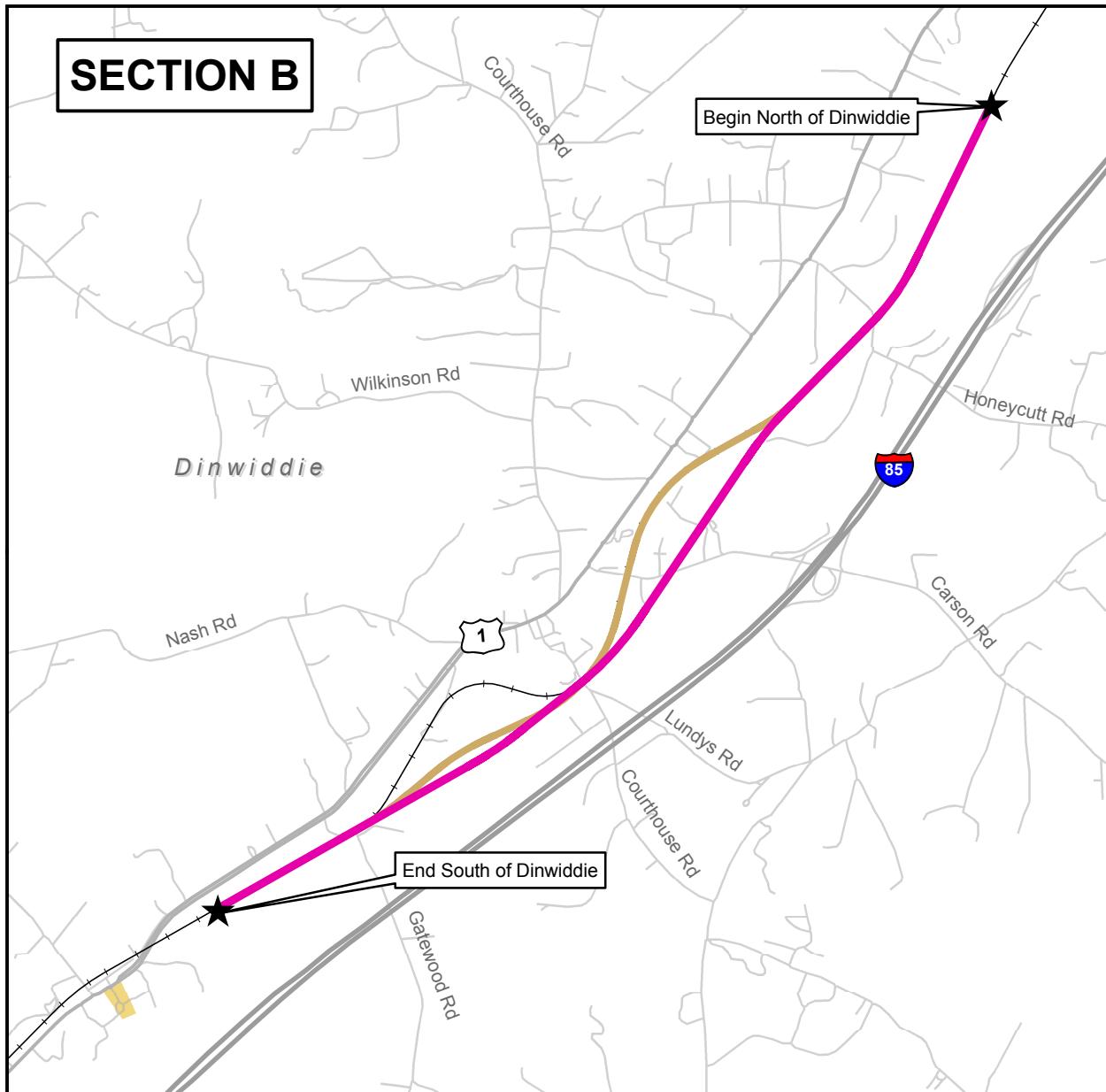
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION A			Topic	SECTION A		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	4.93	4.95	4.93
Number of Stream Crossings	12	12	12	Limiting Speed**	80	95	80
Impacts to Streams (linear feet)	2,897	2,682	2,897	Operability/Constructability***	negative	neutral	negative
Impacts to Wetlands (acres)	2.37	2.30	2.37	Roadwork (miles)	2.4	2.4	2.4
FEMA Floodplain Crossings	1	1	1				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	43.71	57.10	43.71				
Forested uplands (acres)	70.85	68.26	70.85	Rail and Road Construction Cost (millions \$)	\$54.60	\$56.10	\$54.60
Hazardous Materials Sites	1	1	1	Utility Relocation Cost (millions \$)	\$0.42	\$0.42	\$0.42
Residential Relocations	0	0	0	Right-of-Way Cost (millions \$)	\$0.51	\$0.51	\$0.51
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$55.53	\$57.03	\$55.53
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	4	4	4				
Noise (Severely Impacted Receptors)	1	1	1				
Vibration (Impacted Structures)	0	0	0				
Section 4(f) Uses- Historic *	0	0	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	3	3	3				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	0	0	0				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 13



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative VA1\*

■ Historic Resources (Architectural)

— Alternative VA2

□ County Boundary

— Existing Rail Corridor

■ Municipal Boundary

— Rivers

\* Alternatives VA1 and VA3 were common in this section

0 1 Miles

N

## Exhibit 14

### Section B- Alternatives VA1, VA3 on Common Alignment

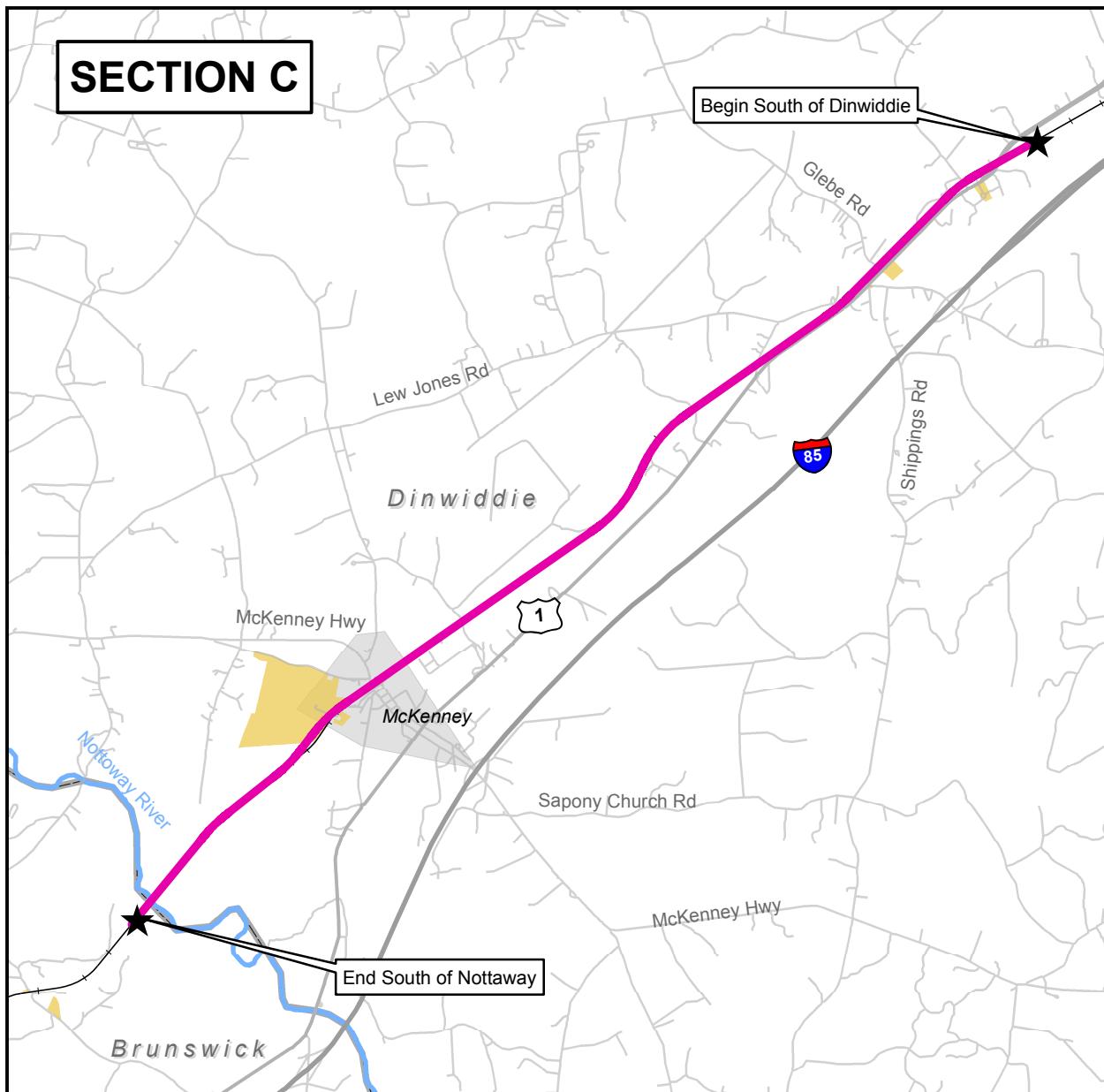
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION B			Topic	SECTION B		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	5.71	5.80	5.71
Number of Stream Crossings	11	9	11	Limiting Speed**	110	90	110
Impacts to Streams (linear feet)	940	496	940	Operability/Constructability***	neutral	negative	neutral
Impacts to Wetlands (acres)	0.97	0.62	0.97	Roadwork (miles)	1.5	1	1.5
FEMA Floodplain Crossings	2	2	2				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	65.40	40.13	65.40				
Forested uplands (acres)	82.38	77.8	82.38	Rail and Road Construction Cost (millions \$)	\$66.70	\$61.20	\$66.70
Hazardous Materials Sites	0	2	0	Utility Relocation Cost (millions \$)	\$0.26	\$0.30	\$0.26
Residential Relocations	4	2	4	Right-of-Way Cost (millions \$)	\$1.54	\$1.30	\$1.54
Business Relocations	0	1	0	<b>TOTAL COSTS</b> (millions \$)	\$68.50	\$62.80	\$68.50
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	13	16	13				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	2	5	2				
Section 4(f) Uses- Historic *	0	0	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	1	1	1				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	0	0	0				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 15



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA1\*      ■ Historic Resources (Architectural)
- Existing Rail Corridor      ▨ County Boundary
- Rivers      □ Municipal Boundary

\* All alternatives were common in this section



## Exhibit 16

### Section C- All Alternatives on Common Alignment

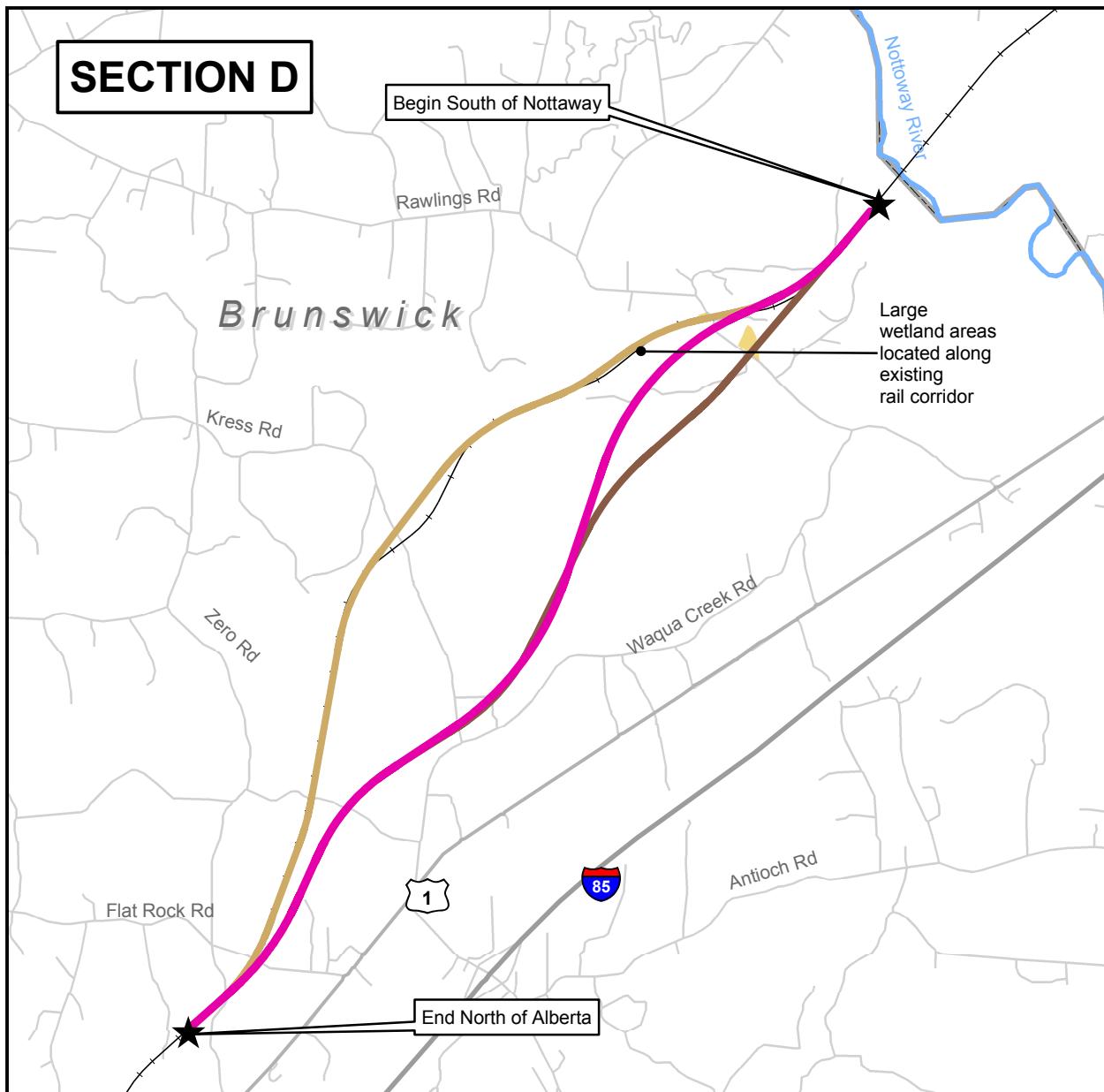
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION C			Topic	SECTION C		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	10.75	10.75	10.75
Number of Stream Crossings	21	21	21	Limiting Speed**	110	110	110
Impacts to Streams (linear feet)	4,025	4,025	4,025	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	1.51	1.51	1.51	Roadwork (miles)	4	4	4
FEMA Floodplain Crossings	1	1	1				
Federal/State Designated Rivers (crossings)	1	1	1				
Impacts to Prime and Other Important Farmland (acres)	94.47	94.47	94.47				
Forested uplands (acres)	156.56	156.56	156.56	Rail and Road Construction Cost (millions \$)	\$108.40	\$108.40	\$108.40
Hazardous Materials Sites	2	2	2	Utility Relocation Cost (millions \$)	\$1.87	\$1.87	\$1.87
Residential Relocations	1	1	1	Right-of-Way Cost (millions \$)	\$4.34	\$4.34	\$4.34
Business Relocations	8	8	8	<b>TOTAL COSTS</b> (millions \$)	\$114.61	\$114.61	\$114.61
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	9	9	9				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	11	11	11				
Section 4(f) Uses- Historic *	0	0	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	0	0	0				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 17



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA4
- Alternatives VA1/VA3
- Alternative VA2
- Existing Rail Corridor
- Rivers
- Historic Resources (Architectural)
- County Boundary
- Municipal Boundary



## Exhibit 18

### Section D- Alternatives VA1, VA3 on Common Alignment, Alternatives VA2 and VA4 on Different Alignments

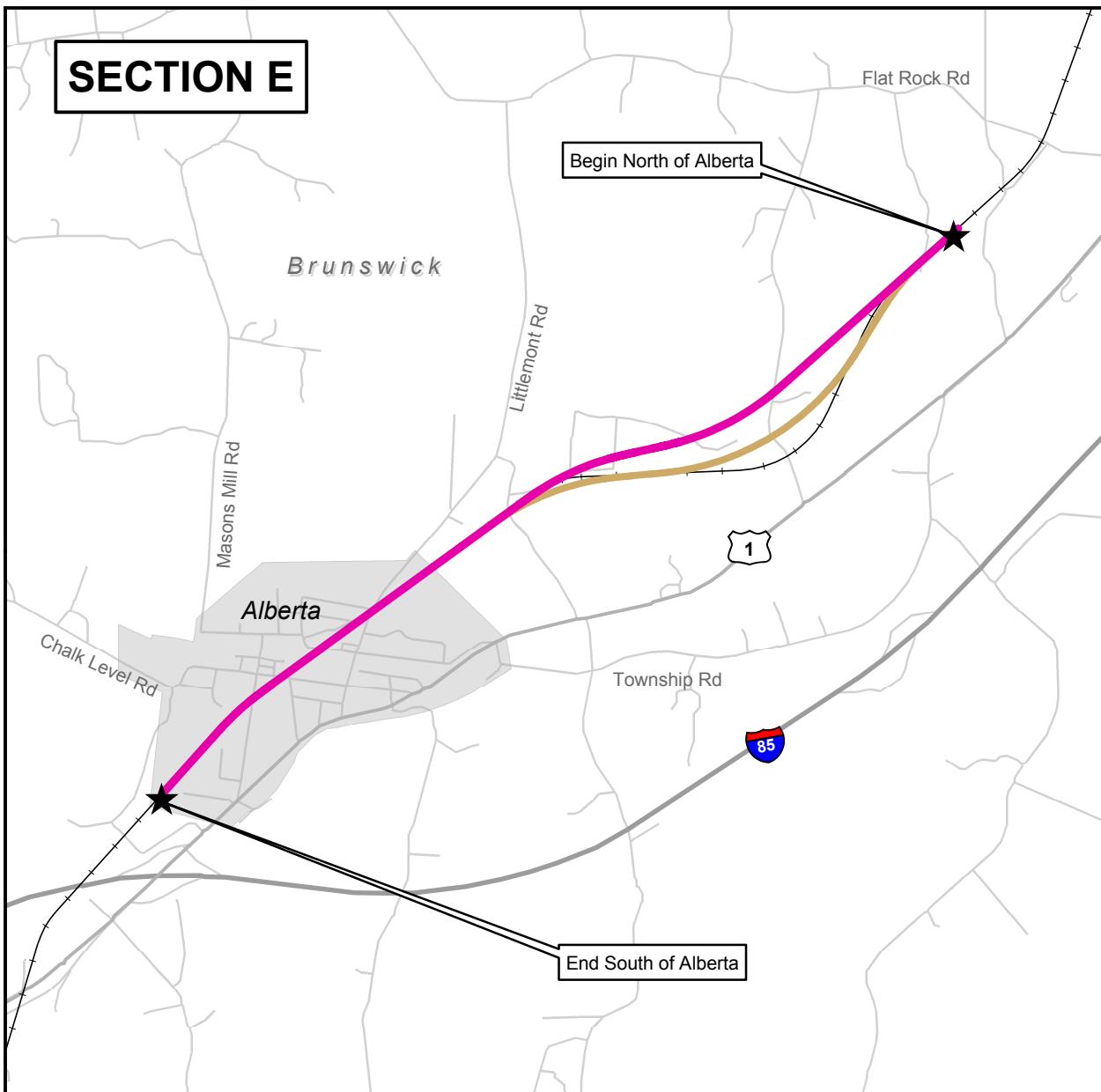
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section				
Topic	SECTION D			Topic	SECTION D			
	VA1	VA2	VA3	VA4	VA1	VA2	VA3	VA4
Federally Listed T&E Species Impacted	1	0	1	0	Mainline Track Length (miles)	6.07	6.41	6.07
Number of Stream Crossings	14	12	14	13	Limiting Speed**	110	110	110
Impacts to Streams (linear feet)	2,050	2,575	2,050	2,069	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	0.99	7.37	0.99	2.32	Roadwork (miles)	1.6	1.5	1.6
FEMA Floodplain Crossings	0	4	0	0				
Federal/State Designated Rivers (crossings)	0	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	80.45	54.45	80.45	89.27				
Forested uplands (acres)	90.99	92.24	90.99	107.72	Rail and Road Construction Cost (millions \$)	\$67.20	\$53.40	\$67.20
Hazardous Materials Sites	0	1	0	1	Utility Relocation Cost (millions \$)	\$1.28	\$0.66	\$1.28
Residential Relocations	3	2	3	3	Right-of-Way Cost (millions \$)	\$1.82	\$1.00	\$1.85
Business Relocations	2	0	2	2	<b>TOTAL COSTS</b> (millions \$)	\$70.30	\$55.06	\$70.30
Public Schools Impacted	0	0	0	0				
Noise (Impacted Receptors)	2	3	2	4				
Noise (Severely Impacted Receptors)	2	1	2	2				
Vibration (Impacted Structures)	3	1	3	2				
Section 4(f) Uses- Historic *	1	0	1	0				
Section 4(f) Uses- Parks *	0	0	0	0				
Section 4(f) De Minimis- Historic *	0	1	0	1				
Section 4(f) De Minimis- Parks *	0	0	0	1				
Section 106 Adverse Effects *	1	0	1	0				

  Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 19



### Southeast High Speed Rail, Richmond, VA to Raleigh, NC

— Recommended Preferred Alternative VA1\*      ■ Historic Resources (Architectural)

— Alternative VA2

— Existing Rail Corridor

— County Boundary

— Rivers

— Municipal Boundary

\* Alternatives VA1 and VA3 were common in this section



## Exhibit 20

### Section E- Alternatives VA1, VA3 on Common Alignment

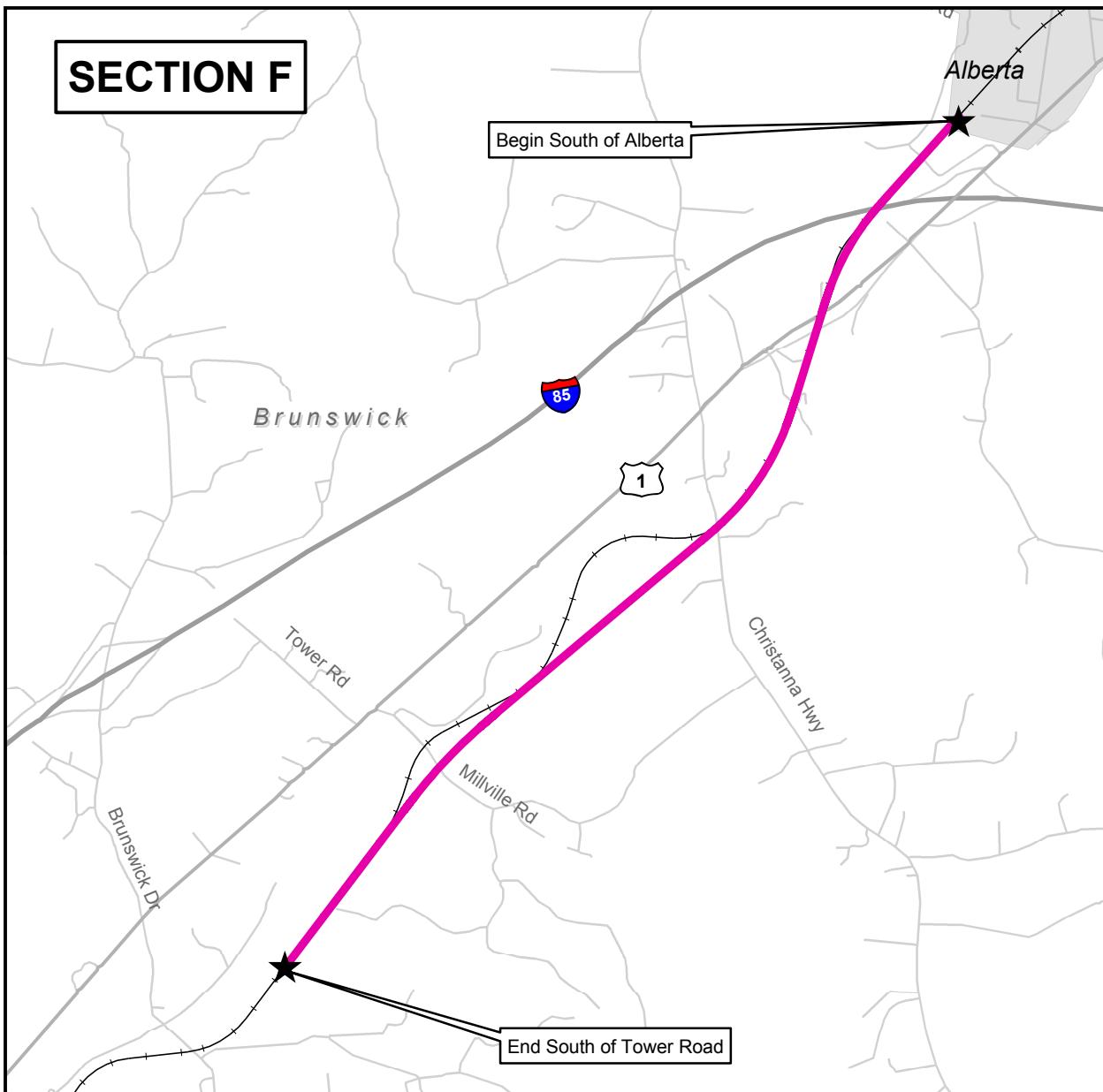
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION E			Topic	SECTION E		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	4.21	4.29	4.21
Number of Stream Crossings	6	6	6	Limiting Speed**	110	110	110
Impacts to Streams (linear feet)	1,025	1,294	1,025	Operability/Constructability***	positive	neutral	positive
Impacts to Wetlands (acres)	0.28	2.41	0.28	Roadwork (miles)	1.8	1.8	1.8
FEMA Floodplain Crossings	1	2	1				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	58.90	60.71	58.90				
Forested uplands (acres)	52.02	57.07	52.02	Rail and Road Construction Cost (millions \$)	\$60.30	\$59.50	\$60.30
Hazardous Materials Sites	0	0	0	Utility Relocation Cost (millions \$)	\$0.77	\$0.77	\$0.77
Residential Relocations	2	9	2	Right-of-Way Cost (millions \$)	\$1.53	\$1.39	\$1.53
Business Relocations	7	0	7	<b>TOTAL COSTS</b> (millions \$)	\$62.60	\$61.66	\$62.60
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	23	22	23				
Noise (Severely Impacted Receptors)	6	6	6				
Vibration (Impacted Structures)	9	11	9				
Section 4(f) Uses- Historic *	0	0	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	1	1	1				
Section 106 Adverse Effects *	0	0	0				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 21



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA1\*
- Existing Rail Corridor
- Rivers
- Historic Resources (Architectural)
- County Boundary
- Municipal Boundary

\* All alternatives were common in this section



## Exhibit 22

### Section F- All Alternatives on Common Alignment

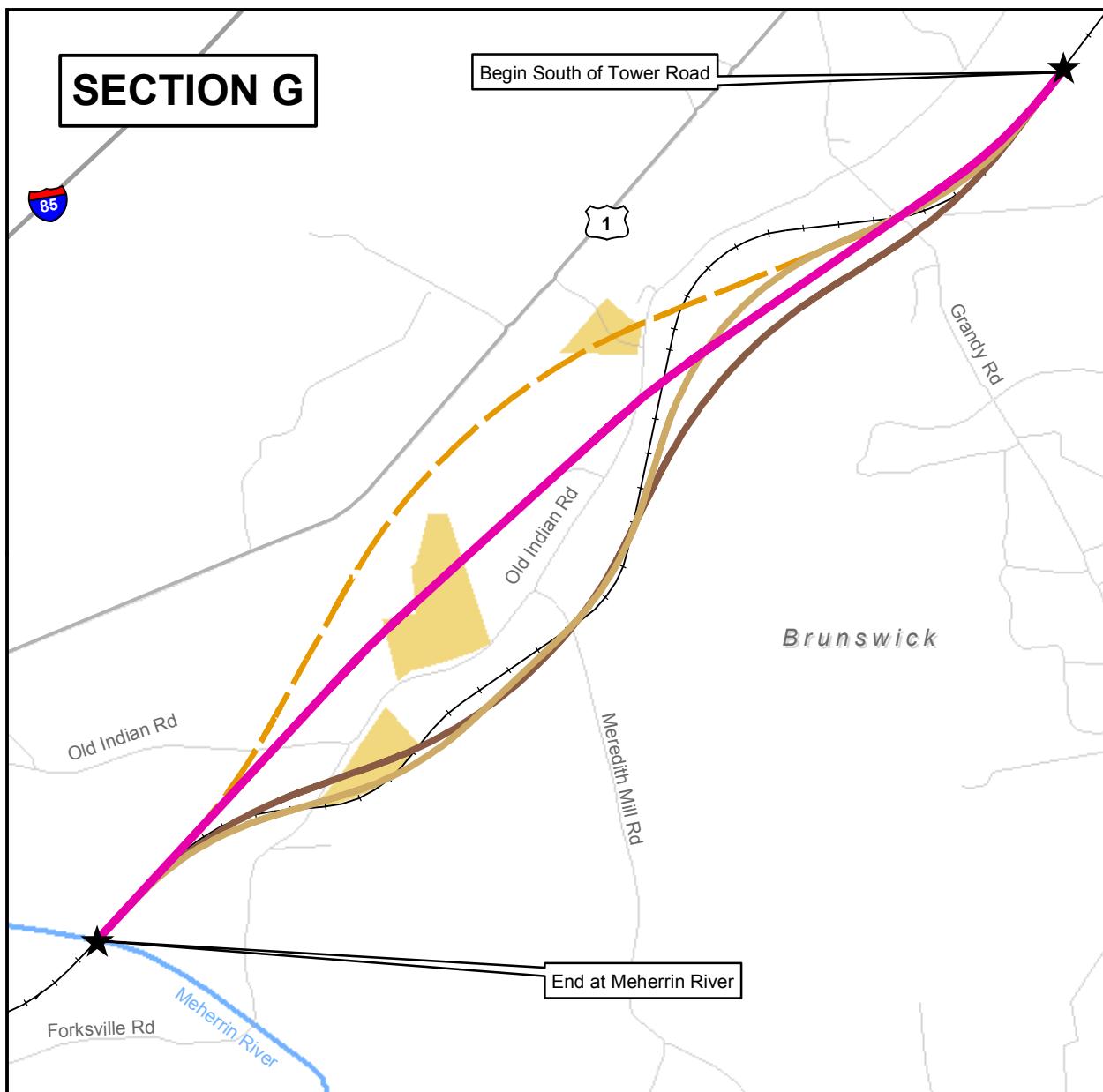
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION F			Topic	SECTION F		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	4.28	4.28	4.28
Number of Stream Crossings	6	6	6	Limiting Speed**	110	110	110
Impacts to Streams (linear feet)	1,185	1,185	1,185	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	0.60	0.60	0.60	Roadwork (miles)	1.6	1.6	1.6
FEMA Floodplain Crossings	2	2	2				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	21.65	21.65	21.65				
Forested uplands (acres)	67.01	67.01	67.01	Rail and Road Construction Cost (millions \$)	\$47.10	\$47.10	\$47.10
Hazardous Materials Sites	0	0	0	Utility Relocation Cost (millions \$)	\$0.41	\$0.41	\$0.41
Residential Relocations	0	0	0	Right-of-Way Cost (millions \$)	\$0.27	\$0.27	\$0.27
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$47.78	\$47.78	\$47.78
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	6	6	6				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	0	0	0				
Section 4(f) Uses- Historic *	0	0	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	0	0	0				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 23



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA3
- Alternative VA2
- Alternative VA1
- Alternative VA4
- Existing Rail Corridor
- Rivers
- County Boundary
- Municipal Boundary

0 1 Miles

N

## Exhibit 24

### Section G- Alternatives VA1, VA2, VA3, VA4 on Different Alignments

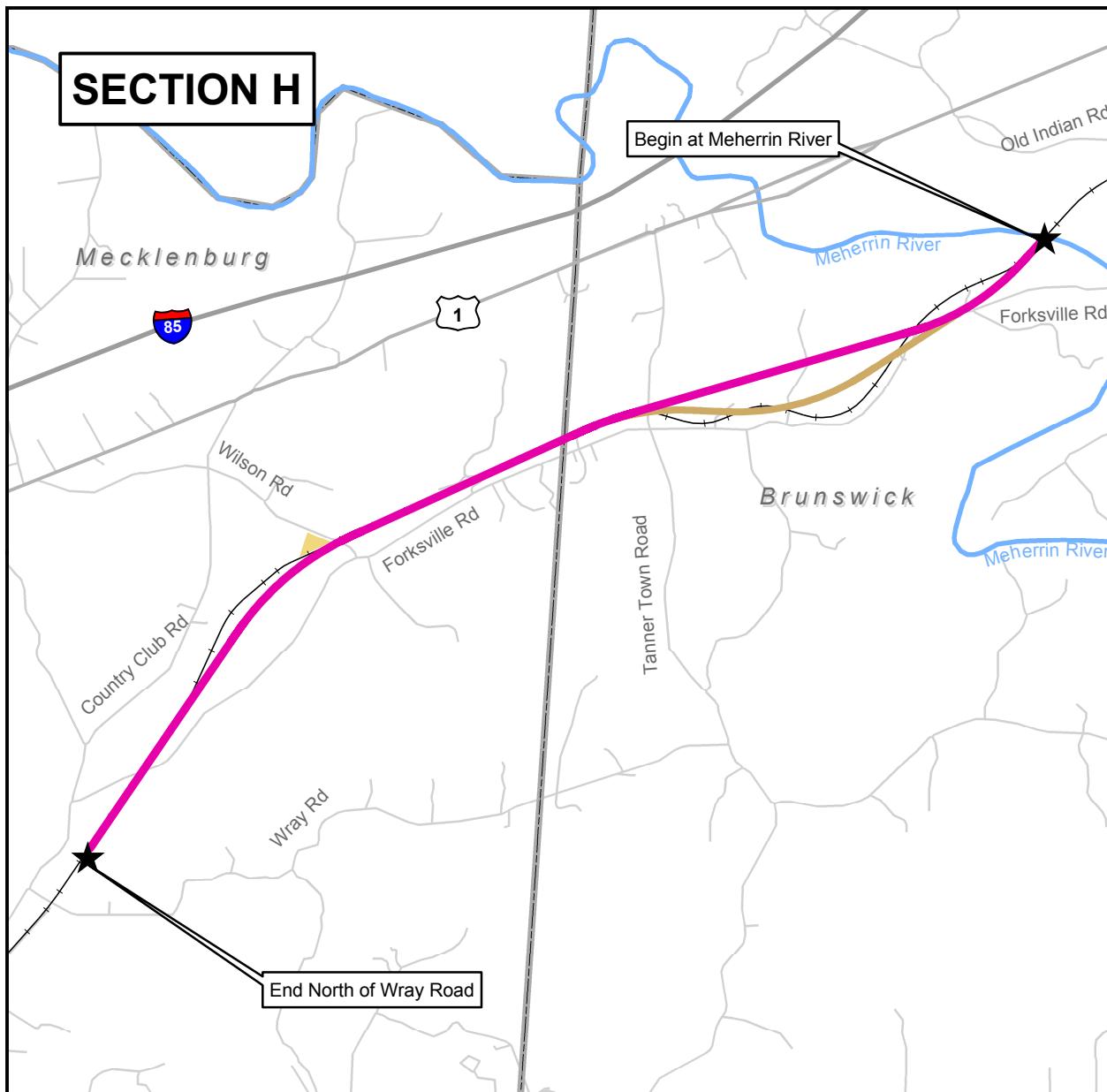
Summary of Potential Human and Natural Impacts By Section		Summary of Operational & Physical Characteristics By Section							
		SECTION G			SECTION G				
Topic	VA1	VA2	VA3	VA4	Topic	VA1	VA2	VA3	VA4
Federally Listed T&E Species Impacted	0	0	0	0	Mainline Track Length (miles)	3.61	3.66	3.55	3.62
Number of Stream Crossings	7	7	6	9	Limiting Speed**	110	90	110	110
Impacts to Streams (linear feet)	654	914	500	1,095	Operability/Constructability***	neutral	negative	positive	positive
Impacts to Wetlands (acres)	0.21	0.49	0.21	0.21	Roadwork (miles)	0.7	0.3	0.60	0.91
FEMA Floodplain Crossings	1	1	1	1					
Federal/State Designated Rivers (crossings)	1	1	1	1					
Impacts to Prime and Other Important Farmland (acres)	25.02	24.96	28.98	49.43					
Forested uplands (acres)	45.54	44.59	43.58	47.55	Rail and Road Construction Cost (millions \$)	\$35.90	\$29.00	36.2	\$40.00
Hazardous Materials Sites	0	0	0	0	Utility Relocation Cost (millions \$)	\$0.19	\$0.16	0.19	\$0.19
Residential Relocations	0	0	2	1	Right-of-Way Cost (millions \$)	\$0.37	\$0.31	0.53	\$0.54
Business Relocations	0	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$36.46	\$29.47	36.92	\$40.73
Public Schools Impacted	0	0	0	0					
Noise (Impacted Receptors)	0	1	2	2					
Noise (Severely Impacted Receptors)	0	0	0	0					
Vibration (Impacted Structures)	1	0	1	0					
Section 4(f) Uses- Historic *	1	0	1	0					
Section 4(f) Uses- Parks *	0	0	0	0					
Section 4(f) De Minimis- Historic *	0	1	0	0					
Section 4(f) De Minimis- Parks *	0	0	0	0					
Section 106 Adverse Effects *	1	0	1	0					

  Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 25



### Southeast High Speed Rail, Richmond, VA to Raleigh, NC

- Recommended Preferred Alternative VA1\*
- Alternative VA2
- Existing Rail Corridor
- Rivers
- Historic Resources (Architectural)
- County Boundary
- Municipal Boundary

\* Alternatives VA1 and VA3 were common in this section



## Exhibit 26

### Section H- Alternatives VA1, VA3 on Common Alignment

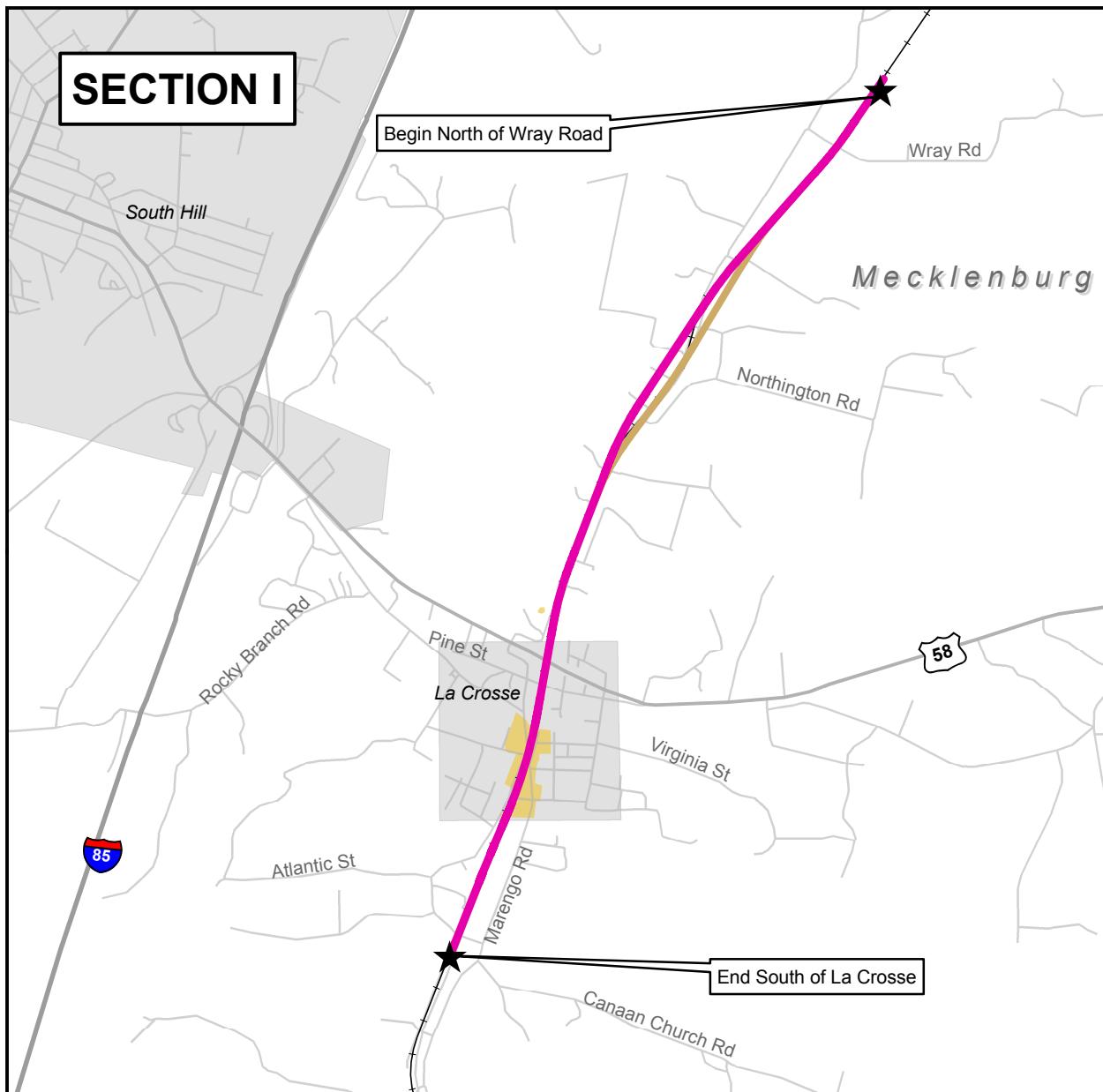
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
SECTION H		Topic		SECTION H		Topic	
Topic	VA1	VA2	VA3	Topic	VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)		5.53	5.58
Number of Stream Crossings	6	7	6	Limiting Speed**		110	110
Impacts to Streams (linear feet)	2,005	2,023	2,005	Operability/Constructability***	positive	neutral	positive
Impacts to Wetlands (acres)	0.25	0.25	0.25	Roadwork (miles)		4.7	4.1
FEMA Floodplain Crossings	0	0	0				4.7
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	79.87	80.20	79.87				
Forested uplands (acres)	110.67	101.45	110.67	Rail and Road Construction Cost (millions \$)	\$78.80	\$74.50	\$78.80
Hazardous Materials Sites	0	0	0	Utility Relocation Cost (millions \$)	\$0.73	\$0.71	\$0.73
Residential Relocations	1	1	1	Right-of-Way Cost (millions \$)	\$1.14	\$1.11	\$1.14
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$80.67	\$76.32	\$80.67
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	18	24	18				
Noise (Severely Impacted Receptors)	2	2	2				
Vibration (Impacted Structures)	5	7	5				
Section 4(f) Uses- Historic *	0	0	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	0	0	0				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 27



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative VA1\*      ■ Historic Resources (Architectural)

— Alternative VA2

— Existing Rail Corridor

— Rivers

County Boundary

Municipal Boundary

\* Alternatives VA1 and VA3 were common in this section



## Exhibit 28

### Section I- Alternatives VA1, VA3 on Common Alignment

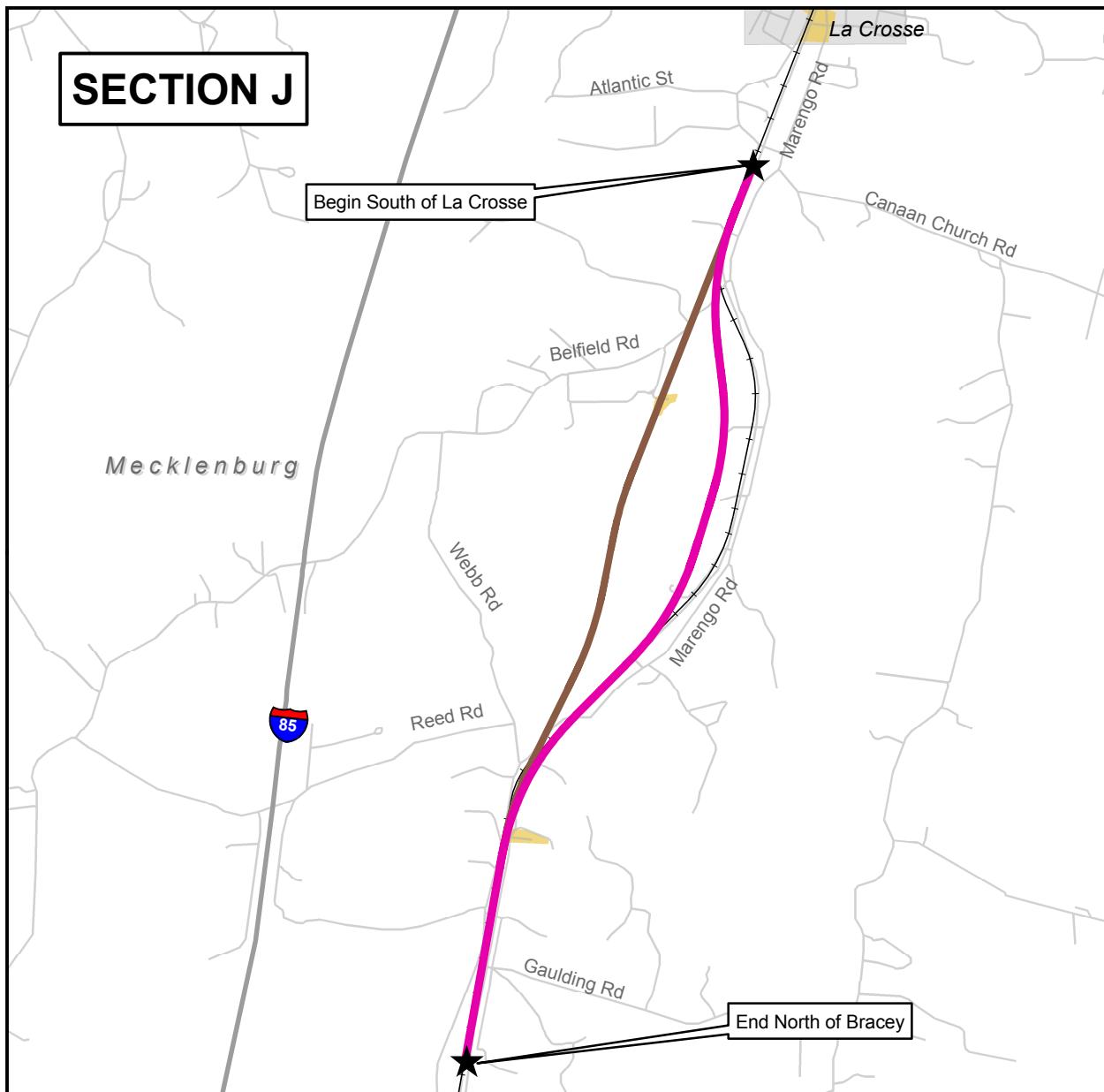
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION I			Topic	SECTION I		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	3.77	3.77	3.77
Number of Stream Crossings	0	0	0	Limiting Speed**	110	110	110
Impacts to Streams (linear feet)	6	6	6	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	0.00	0.00	0.00	Roadwork (miles)	2.6	3.8	2.6
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	57.54	65.95	57.54				
Forested uplands (acres)	35.51	40.08	35.51	Rail and Road Construction Cost (millions \$)	\$36.40	\$46.60	\$36.40
Hazardous Materials Sites	2	2	2	Utility Relocation Cost (millions \$)	\$0.99	\$0.92	\$0.99
Residential Relocations	14	8	14	Right-of-Way Cost (millions \$)	\$1.93	\$2.25	\$1.93
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$39.32	\$49.77	\$39.32
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	50	50	50				
Noise (Severely Impacted Receptors)	5	5	5				
Vibration (Impacted Structures)	24	21	24				
Section 4(f) Uses- Historic *	1	1	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	2	2	2				
Section 106 Adverse Effects *	1	1	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 29



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA2
- Alternatives VA1 /VA3
- Existing Rail Corridor
- Rivers
- Historic Resources (Architectural)
- County Boundary
- Municipal Boundary



## Exhibit 30

### Section J- Alternatives VA1, VA3 on Common Alignment

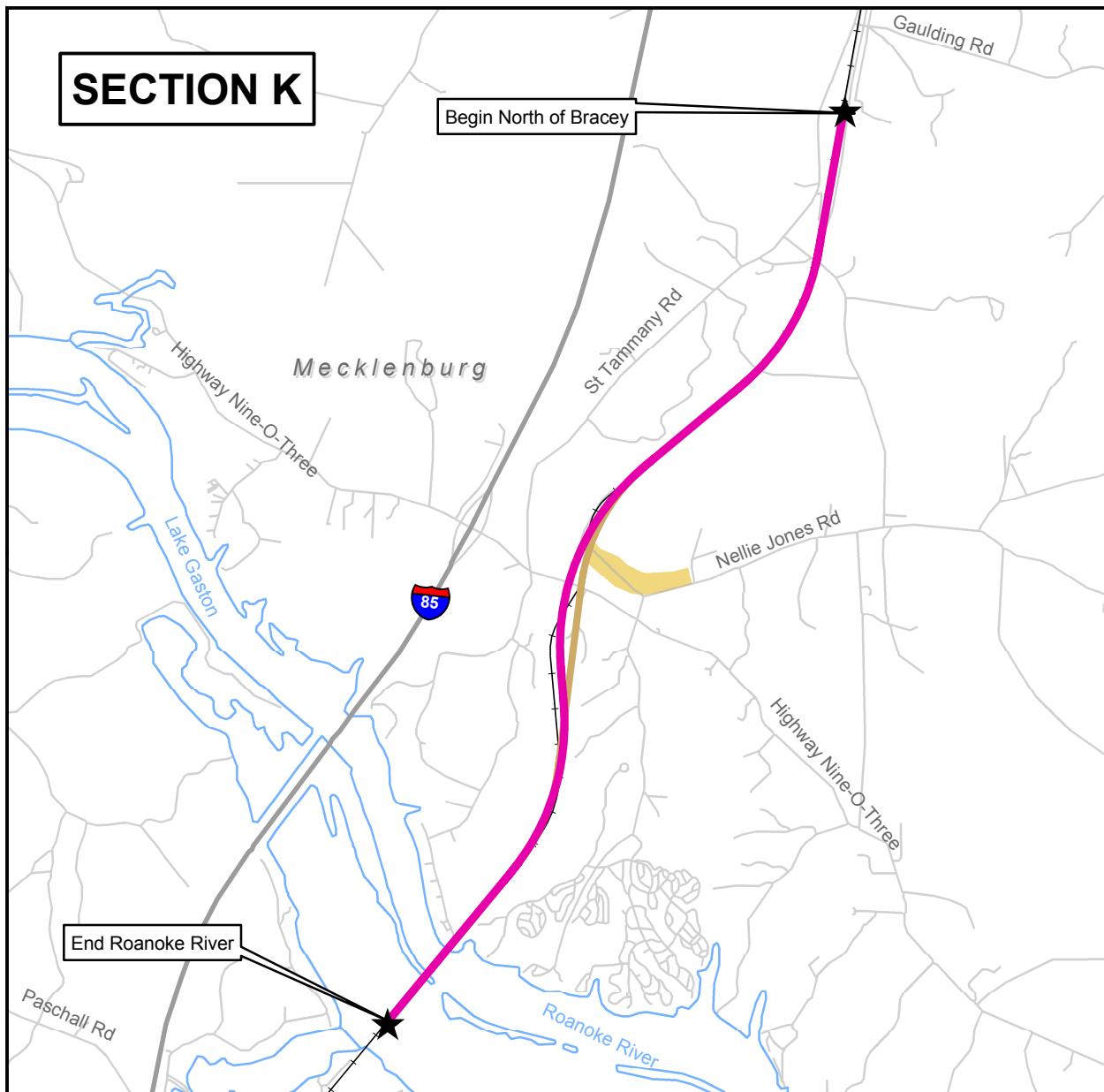
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION J			Topic	SECTION J		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	3.99	4.10	3.99
Number of Stream Crossings	5	3	5	Limiting Speed**	110	110	110
Impacts to Streams (linear feet)	2,061	698	2,061	Operability/Constructability***	positive	neutral	positive
Impacts to Wetlands (acres)	0.00	0.10	0.00	Roadwork (miles)	2.5	2.7	2.5
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	80.43	71.69	80.43				
Forested uplands (acres)	64.27	61.63	64.27	Rail and Road Construction Cost (millions \$)	\$42.10	\$40.60	\$42.10
Hazardous Materials Sites	1	0	1	Utility Relocation Cost (millions \$)	\$0.41	\$1.00	\$0.41
Residential Relocations	6	5	6	Right-of-Way Cost (millions \$)	\$1.16	\$1.42	\$1.16
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$43.67	\$43.02	\$43.67
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	11	21	11				
Noise (Severely Impacted Receptors)	1	1	1				
Vibration (Impacted Structures)	5	5	5				
Section 4(f) Uses- Historic *	1	0	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	1	0	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 31



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA1 \*
- Alternative VA2
- Existing Rail Corridor
- Rivers

■ Historic Resources (Architectural)

□ County Boundary

■ Municipal Boundary

\* Alternatives VA1 and VA3 were common in this section



## Exhibit 32

### Section K- Alternatives VA1, VA3 on Common Alignment

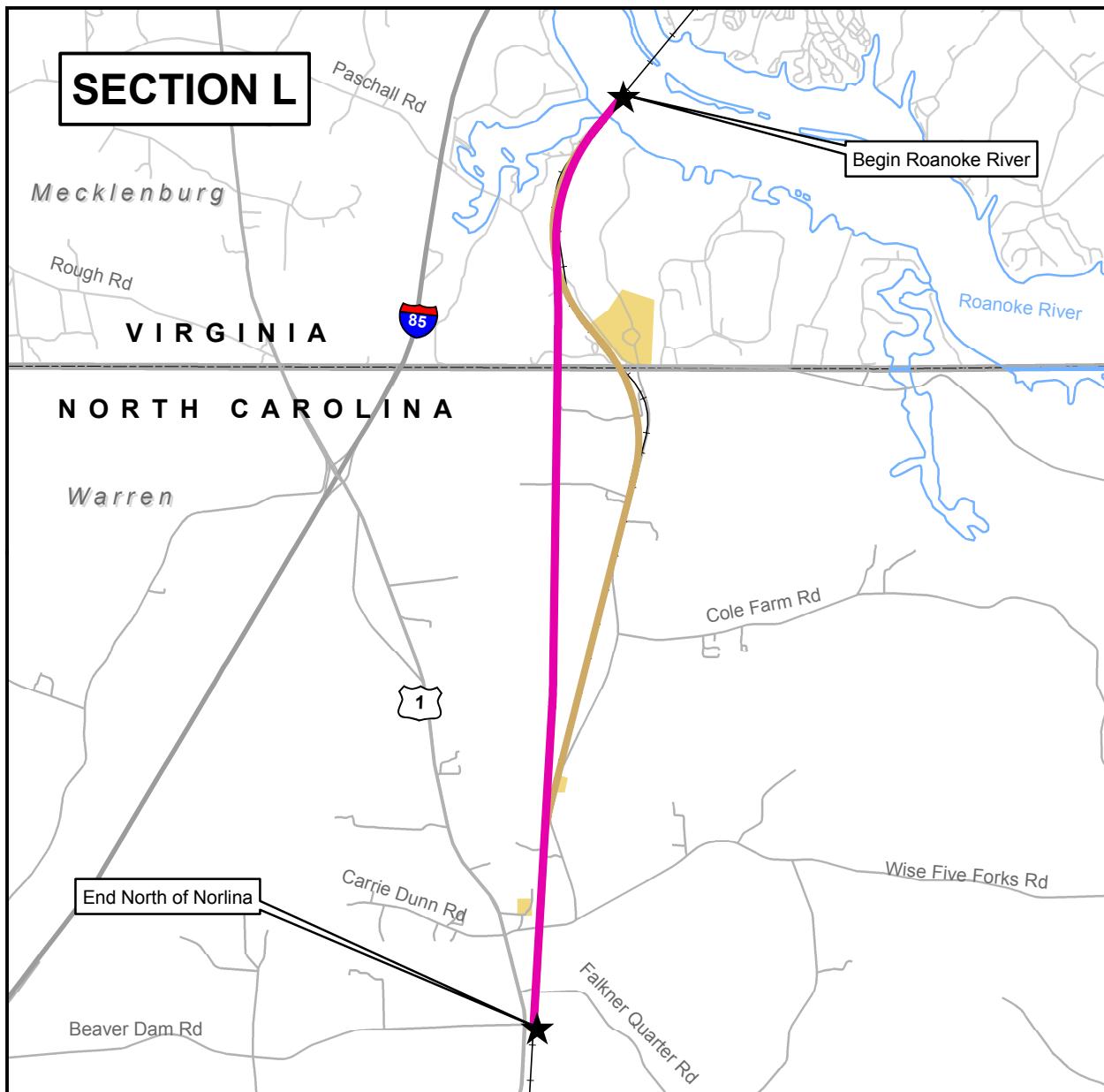
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION K			Topic	SECTION K		
	VA1	VA2	VA3		VA1	VA2	VA3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	4.96	4.94	4.96
Number of Stream Crossings	10	10	10	Limiting Speed**	110	100	110
Impacts to Streams (linear feet)	1,927	2,447	1,927	Operability/Constructability***	neutral	negative	neutral
Impacts to Wetlands (acres)	0.46	0.47	0.46	Roadwork (miles)	0.2	0	0.2
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	1	1	1				
Impacts to Prime and Other Important Farmland (acres)	36.55	41.40	36.55				
Forested uplands (acres)	79.22	79.94	79.22	Rail and Road Construction Cost (millions \$)	\$82.80	\$77.00	\$82.80
Hazardous Materials Sites	0	0	0	Utility Relocation Cost (millions \$)	\$0.40	\$0.40	\$0.40
Residential Relocations	0	1	0	Right-of-Way Cost (millions \$)	\$1.57	\$0.90	\$1.57
Business Relocations	5	2	5	<b>TOTAL COSTS</b> (millions \$)	\$84.77	\$78.30	\$84.77
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	9	8	9				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	1	2	1				
Section 4(f) Uses- Historic *	0	1	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	0	1	0				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 33



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative VA1/NC1 \*
- Alternative VA2/NC2
- Existing Rail Corridor
- Rivers
- Historic Resources (Architectural)
- County Boundary
- Municipal Boundary

\* Alternatives VA1/NC1 and VA3/NC3 were common in this section



### Exhibit 34

#### Section L- Includes Areas in Virginia and North Carolina Alternatives VA1/NC1 and VA3/NC3 on Common Alignment

##### Summary of Potential Human and Natural Impacts By Section

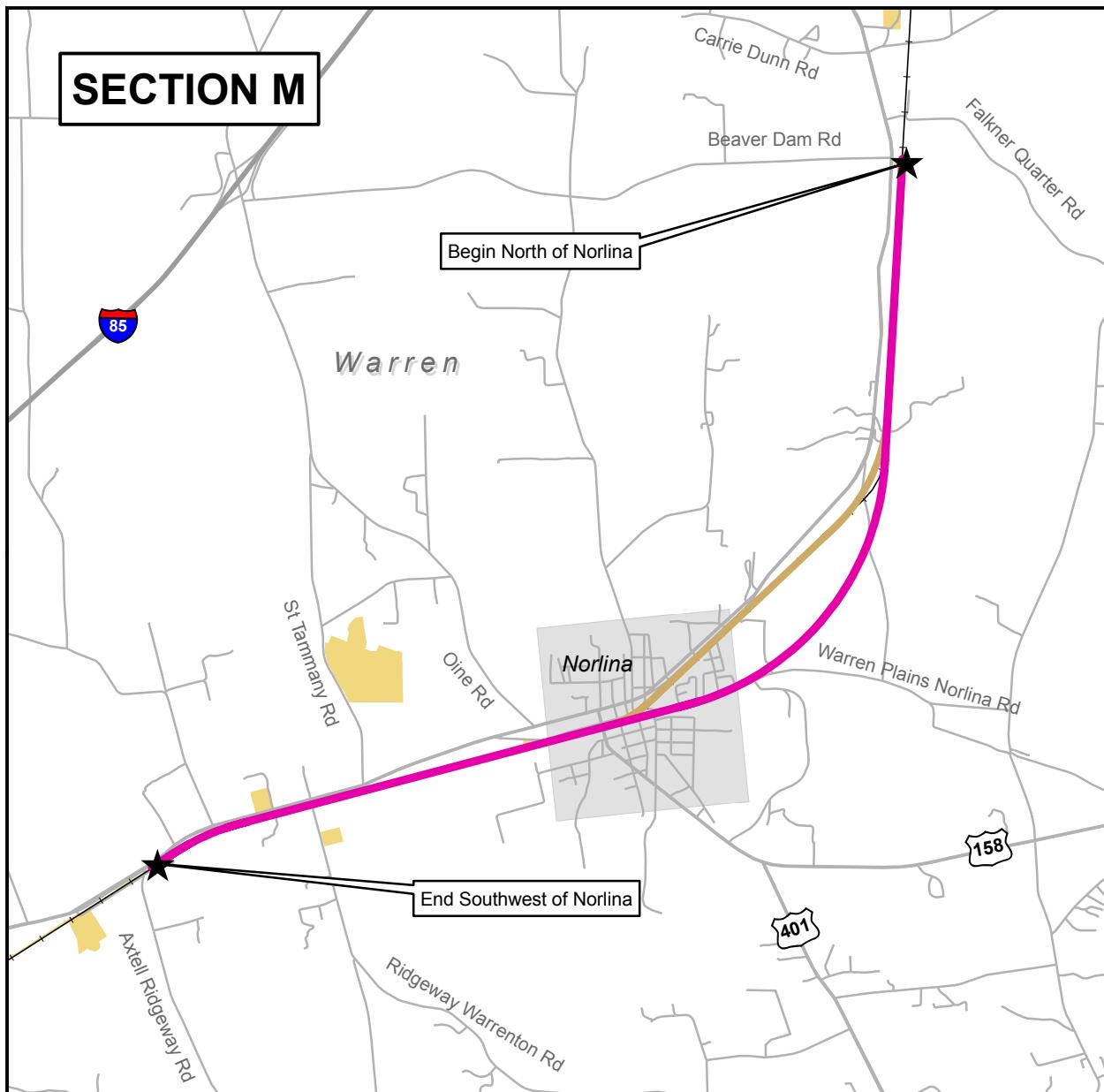
Topic	SECTION L			SECTION L			
	VA1/NC1	VA2/NC2	VA3/NC3	Topic	VA1/NC1	VA2/NC2	VA3/NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	5.75	5.96	5.75
Number of Stream Crossings	14	9	14	Limiting Speed**	110	100	110
Impacts to Streams (linear feet)	2,809	1,422	2,809	Operability/Constructability***	neutral	negative	neutral
Impacts to Wetlands (acres)	0.57	0.01	0.57	Roadwork (miles)	6.5	8.1	6.5
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	122.74	125.95	122.74				
Forested uplands (acres)	91.32	73.19	91.32	Rail and Road Construction Cost (millions \$)	\$63.00	\$71.30	\$63.00
Hazardous Materials Sites	1	1	1	Utility Relocation Cost (millions \$)	\$1.00	\$1.34	\$1.00
Residential Relocations	12	17	12	Right-of-Way Cost (millions \$)	\$5.42	\$5.36	\$5.42
Business Relocations	1	1	1	<b>TOTAL COSTS</b> (millions \$)	\$69.42	\$78.00	\$69.42
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	20	32	20				
Noise (Severely Impacted Receptors)	1	3	1				
Vibration (Impacted Structures)	7	13	7				
Section 4(f) Uses- Historic *	0	1	0				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	0	1	0				

  Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 35



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative NC1\*      ■ Historic Resources (Architectural)

— Alternative NC2

— Existing Rail Corridor

— Rivers

County Boundary

Municipal Boundary

\* Alternatives NC1 and NC3 were common in this section

0 1 Miles



## Exhibit 36

### Section M- Alternatives NC1, NC3 on Common Alignment

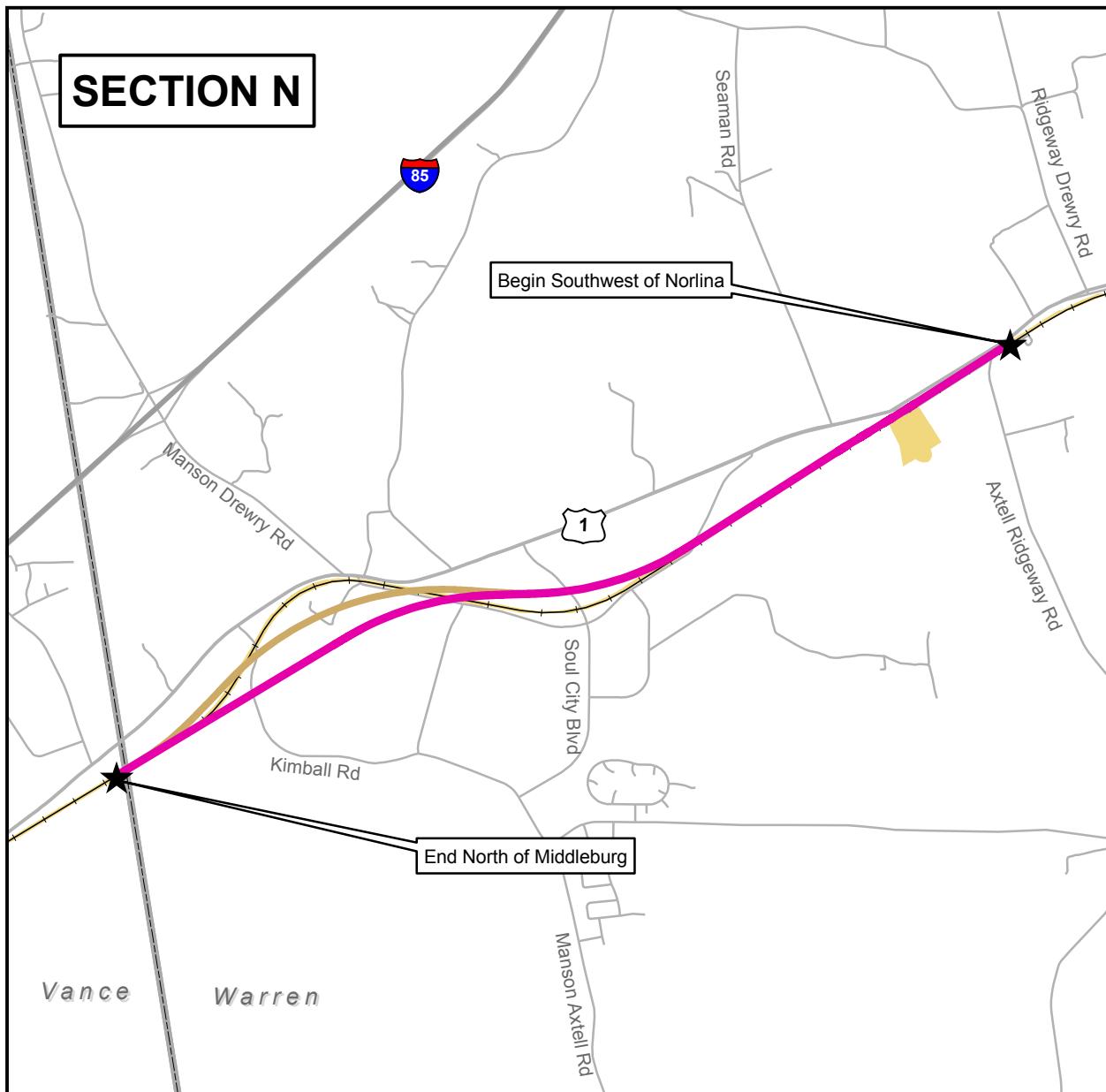
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION M			Topic	SECTION M		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	6.14	5.97	6.14
Number of Stream Crossings	2	4	2	Limiting Speed**	110	80	110
Impacts to Streams (linear feet)	442	511	442	Operability/Constructability***	neutral	negative	neutral
Impacts to Wetlands (acres)	0.00	0.00	0.00	Roadwork (miles)	7.5	7	7.5
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	90.80	85.00	90.80				
Forested uplands (acres)	48.12	52.7	48.12	Rail and Road Construction Cost (millions \$)	\$76.10	\$74.30	\$76.10
Hazardous Materials Sites	0	0	0	Utility Relocation Cost (millions \$)	\$1.34	\$1.34	\$1.34
Residential Relocations	21	20	21	Right-of-Way Cost (millions \$)	\$5.77	\$5.10	\$5.77
Business Relocations	4	4	4	<b>TOTAL COSTS</b> (millions \$)	\$83.21	\$80.74	\$83.21
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	41	48	41				
Noise (Severely Impacted Receptors)	6	1	6				
Vibration (Impacted Structures)	30	28	30				
Section 4(f) Uses- Historic *	1	1	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	1	1	1				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	2	2	2				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 37



### Southeast High Speed Rail, Richmond, VA to Raleigh, NC

— Recommended Preferred Alternative NC1\*

■ Historic Resources (Architectural)

— Alternative NC2

□ County Boundary

— Existing Rail Corridor

■ Municipal Boundary

— Rivers

\* Alternatives NC1 and NC3 were common in this section



## Exhibit 38

### Section N- Alternatives NC1, NC3 on Common Alignment

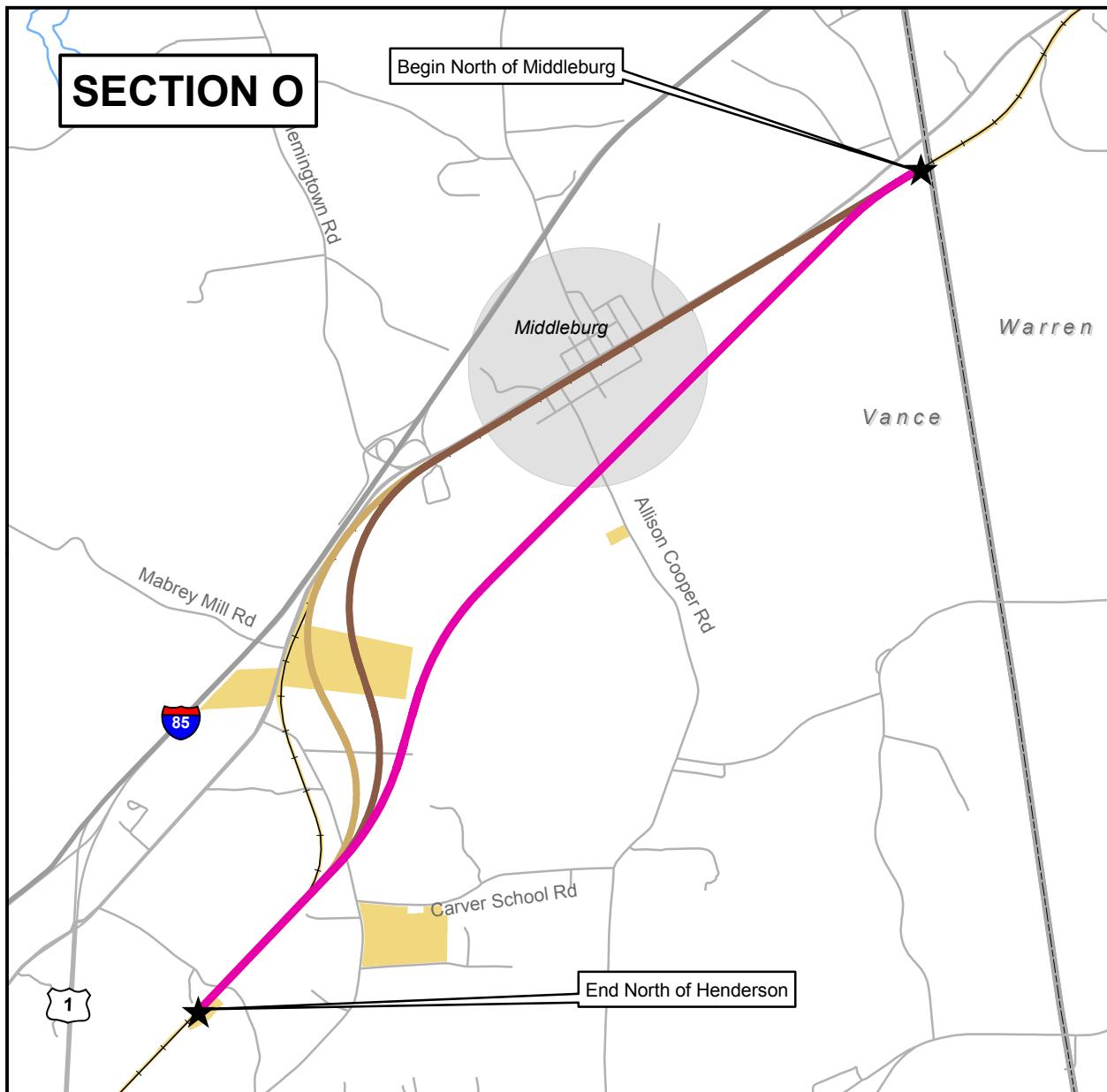
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION N			Topic	SECTION N		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	3.71	3.77	3.71
Number of Stream Crossings	3	4	3	Limiting Speed**	110	110	110
Impacts to Streams (linear feet)	385	715	385	Operability/Constructability***	positive	neutral	positive
Impacts to Wetlands (acres)	1.25	0.18	1.25	Roadwork (miles)	2.5	2.8	2.5
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	65.39	74.38	65.39				
Forested uplands (acres)	42.61	44.32	42.61	Rail and Road Construction Cost (millions \$)	\$40.70	\$42.60	\$40.70
Hazardous Materials Sites	1	1	1	Utility Relocation Cost (millions \$)	\$0.51	\$0.46	\$0.51
Residential Relocations	2	7	2	Right-of-Way Cost (millions \$)	\$2.08	\$2.57	\$2.08
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$43.29	\$45.63	\$43.29
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	4	6	4				
Noise (Severely Impacted Receptors)	0	1	0				
Vibration (Impacted Structures)	2	2	2				
Section 4(f) Uses- Historic *	1	1	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	1	1	1				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	1	1	1				

  Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 39



### Southeast High Speed Rail, Richmond, VA to Raleigh, NC

- Recommended Preferred Alternative NC3
- Alternative NC1
- Alternative NC2
- Existing Rail Corridor
- Rivers
- Historic Resources (Architectural)
- County Boundary
- Municipal Boundary

0 1 Miles



## Exhibit 40

### Section O- Alternatives NC1, NC2, NC3 on Different Alignments

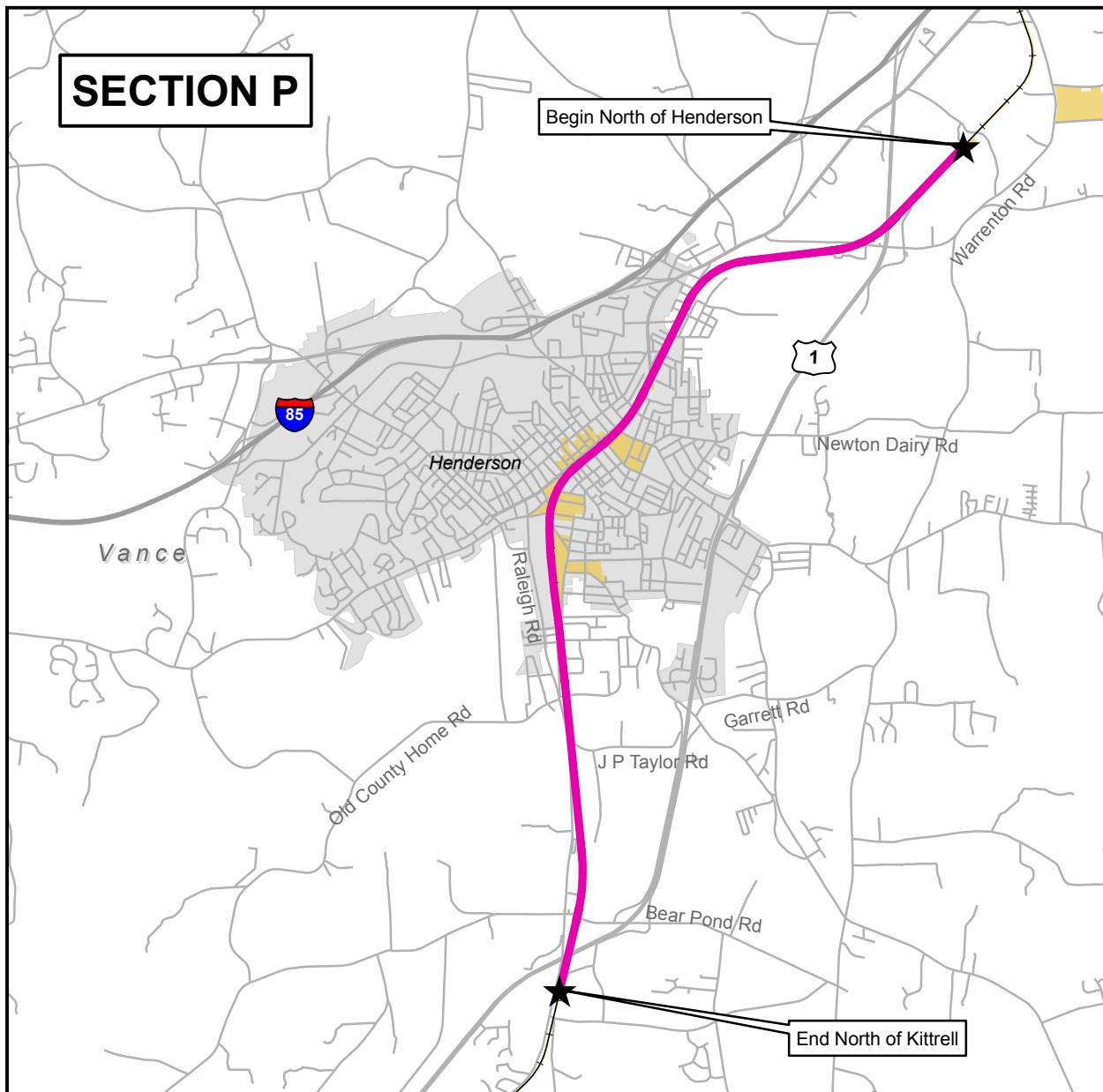
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION O			Topic	SECTION O		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	5.09	5.16	4.70
Number of Stream Crossings	5	6	12	Limiting Speed**	90	80	110
Impacts to Streams (linear feet)	693	915	3,102	Operability/Constructability***	negative	negative	neutral
Impacts to Wetlands (acres)	0.40	1.63	0.20	Roadwork (miles)	5	5.9	4.9
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	106.22	108.13	125.78				
Forested uplands (acres)	25.26	20.91	46.21	Rail and Road Construction Cost (millions \$)	\$69.60	\$65.50	\$66.80
Hazardous Materials Sites	2	2	0	Utility Relocation Cost (millions \$)	\$0.20	\$0.20	\$0.19
Residential Relocations	9	9	3	Right-of-Way Cost (millions \$)	\$3.56	\$4.19	\$3.84
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$73.36	\$69.89	\$70.83
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	26	26	10				
Noise (Severely Impacted Receptors)	6	6	5				
Vibration (Impacted Structures)	14	11	6				
Section 4(f) Uses- Historic *	2	2	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	1	1	1				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	2	2	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 41



### Southeast High Speed Rail, Richmond, VA to Raleigh, NC

- Recommended Preferred Alternative NC1\*
- Existing Rail Corridor
- Rivers
- Historic Resources (Architectural)
- County Boundary
- Municipal Boundary

\* All alternatives were common in this section



## Exhibit 42

### Section P- All Alternatives on Common Alignment

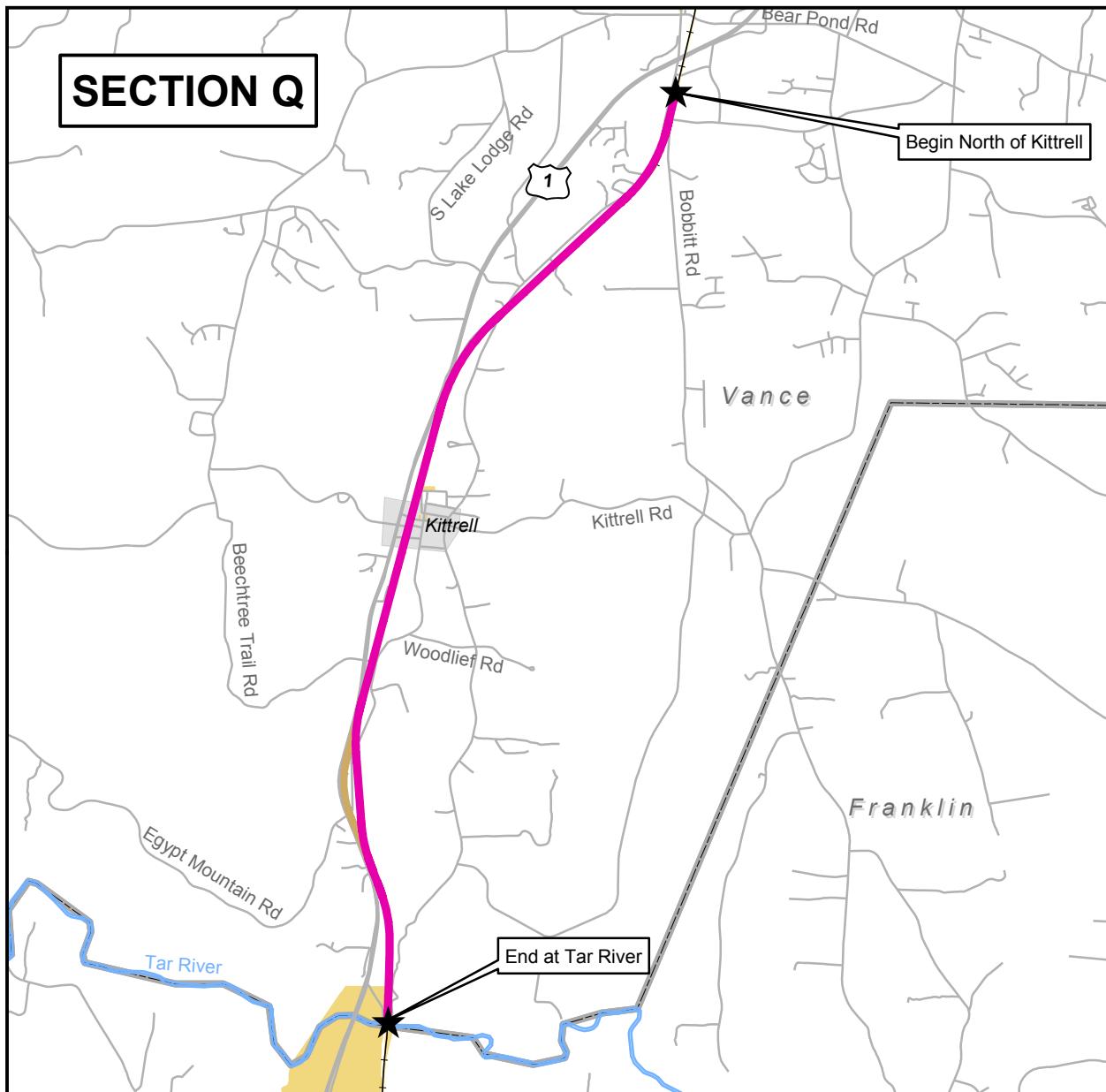
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION P			Topic	SECTION P		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	7.99	7.99	7.99
Number of Stream Crossings	7	7	7	Limiting Speed**	80	80	80
Impacts to Streams (linear feet)	1,520	1,520	1,520	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	0.91	0.91	0.91	Roadwork (miles)	10	10	10
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	87.73	87.83	87.73				
Forested uplands (acres)	16.07	16.07	16.07	Rail and Road Construction Cost (millions \$)	\$105.30	\$105.30	\$105.30
Hazardous Materials Sites	22	22	22	Utility Relocation Cost (millions \$)	\$2.68	\$2.68	\$2.68
Residential Relocations	18	18	18	Right-of-Way Cost (millions \$)	\$6.97	\$6.97	\$6.97
Business Relocations	6	6	6	<b>TOTAL COSTS</b> (millions \$)	\$114.95	\$114.95	\$114.95
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	78	78	78				
Noise (Severely Impacted Receptors)	11	11	11				
Vibration (Impacted Structures)	74	74	74				
Section 4(f) Uses- Historic *	3	3	3				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	2	2	2				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	3	3	3				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 43



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative NC1\*

■ Historic Resources (Architectural)

— Alternative NC2

— County Boundary

— Existing Rail Corridor

■ Municipal Boundary

— Rivers

\* Alternatives NC1 and NC3 were common in this section

0 1 Miles



## Exhibit 44

### Section Q- Alternatives NC1, NC3 on Common Alignment

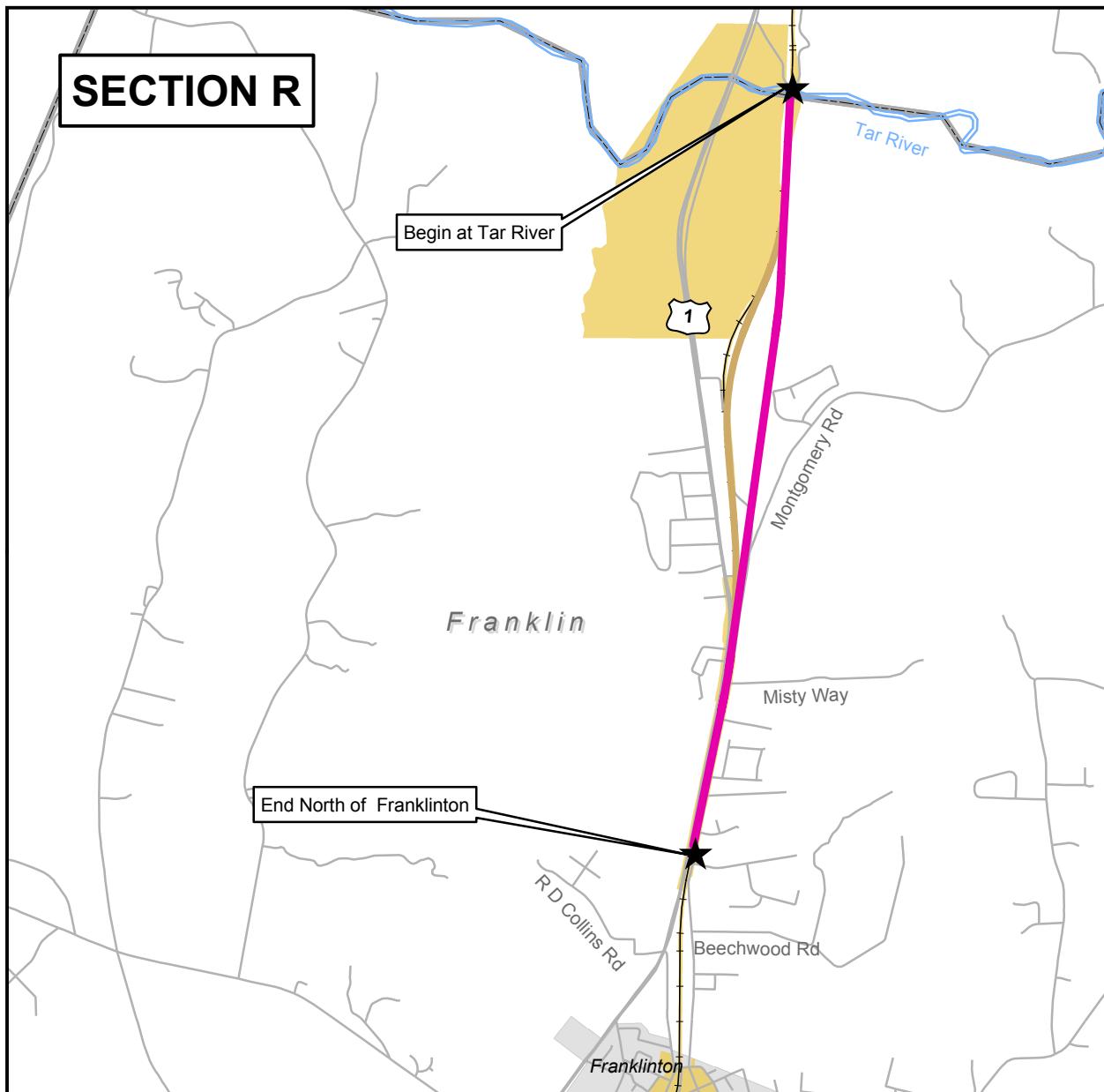
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION Q			Topic	SECTION Q		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	7.70	7.73	7.70
Number of Stream Crossings	9	9	9	Limiting Speed**	110	90	110
Impacts to Streams (linear feet)	1,009	1,009	1,009	Operability/Constructability***	neutral	negative	neutral
Impacts to Wetlands (acres)	0.03	0.03	0.03	Roadwork (miles)	4.4	4.2	4.4
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	1	1	1				
Impacts to Prime and Other Important Farmland (acres)	94.78	84.30	94.78				
Forested uplands (acres)	48.89	43.41	48.89	Rail and Road Construction Cost (millions \$)	\$77.40	\$78.30	\$77.40
Hazardous Materials Sites	4	4	4	Utility Relocation Cost (millions \$)	\$0.68	\$0.68	\$0.68
Residential Relocations	17	14	17	Right-of-Way Cost (millions \$)	\$7.94	\$6.74	\$7.94
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$86.02	\$85.72	\$86.02
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	13	13	13				
Noise (Severely Impacted Receptors)	5	5	5				
Vibration (Impacted Structures)	20	20	20				
Section 4(f) Uses- Historic *	1	1	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	1	1	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 45



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative NC1\*

■ Historic Resources (Architectural)

— Alternative NC2

□ County Boundary

— Existing Rail Corridor

■ Municipal Boundary

— Rivers

\* Alternatives NC1 and NC3 were common in this section

0 1 Miles



## Exhibit 46

### Section R- Alternatives NC1, NC3 on Common Alignment

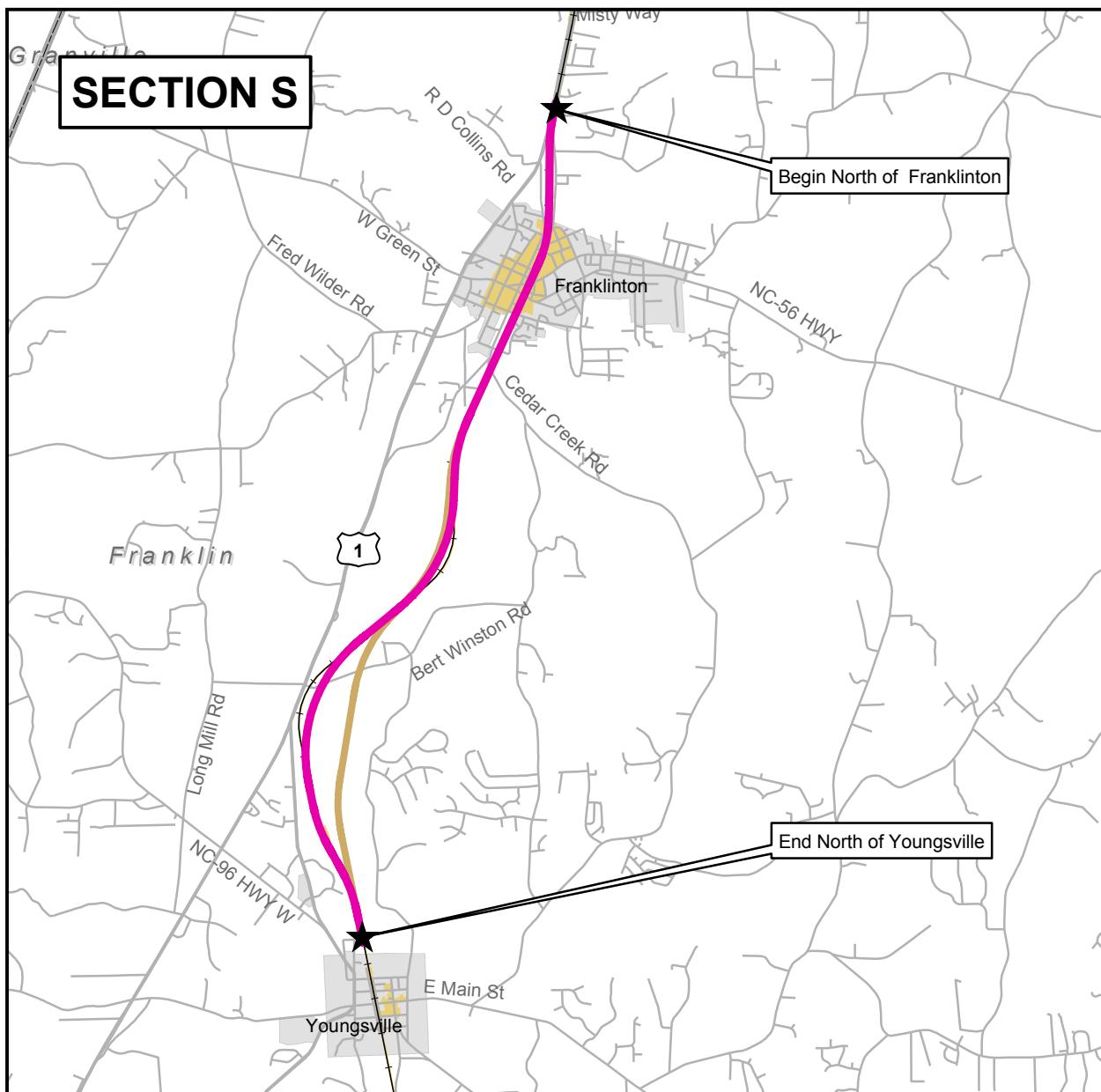
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION R			Topic	SECTION R		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	3.21	3.23	3.21
Number of Stream Crossings	2	2	2	Limiting Speed**	110	110	110
Impacts to Streams (linear feet)	475	1,018	475	Operability/Constructability***	positive	neutral	positive
Impacts to Wetlands (acres)	0.00	0.00	0.00	Roadwork (miles)	0.3	0.3	0.3
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	25.83	12.72	25.83				
Forested uplands (acres)	33.78	21.95	33.78	Rail and Road Construction Cost (millions \$)	\$22.80	\$21.30	\$22.80
Hazardous Materials Sites	0	0	0	Utility Relocation Cost (millions \$)	\$0.02	\$0.02	\$0.02
Residential Relocations	0	1	0	Right-of-Way Cost (millions \$)	\$3.18	\$0.71	\$3.18
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$26.00	\$22.03	\$26.00
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	1	1	1				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	3	2	3				
Section 4(f) Uses- Historic *	1	1	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	1	1	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 47



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative NC1\*

■ Historic Resources (Architectural)

— Alternative NC2

— County Boundary

— Existing Rail Corridor

■ Municipal Boundary

— Rivers

\* Alternatives NC1 and NC3 were common in this section



## Exhibit 48

### Section S- Alternatives NC1, NC3 on Common Alignment

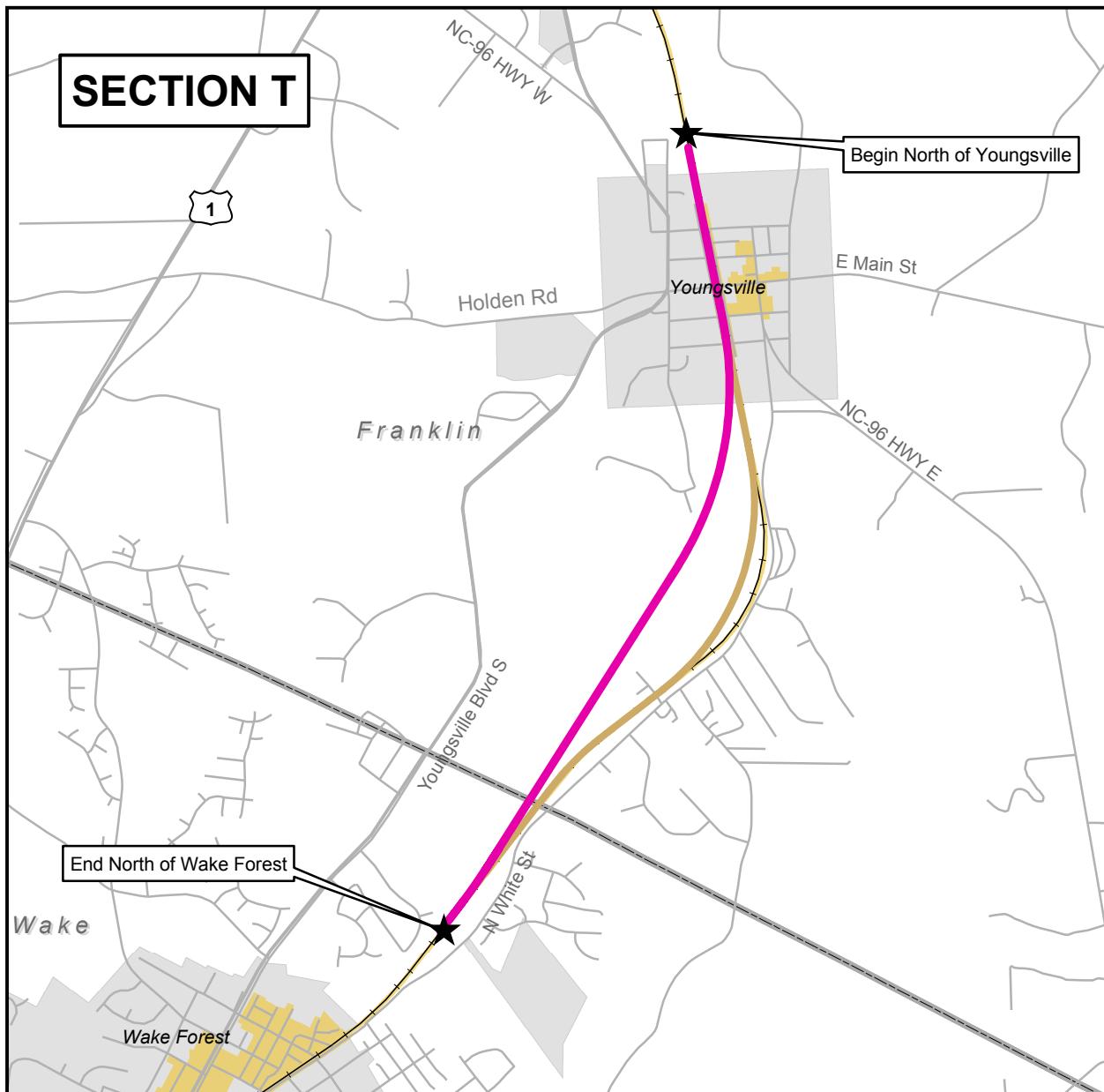
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION S			Topic	SECTION S		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	6.88	6.71	6.88
Number of Stream Crossings	11	11	11	Limiting Speed**	95	95	95
Impacts to Streams (linear feet)	2,120	2,720	2,120	Operability/Constructability***	neutral	neutral	neutral
Impacts to Wetlands (acres)	0.55	0.07	0.55	Roadwork (miles)	4.2	4.1	4.2
FEMA Floodplain Crossings	1	1	1				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	94.88	105.65	94.88				
Forested uplands (acres)	94.61	101.43	94.61	Rail and Road Construction Cost (millions \$)	\$87.00	\$85.20	\$87.00
Hazardous Materials Sites	6	5	6	Utility Relocation Cost (millions \$)	\$1.05	\$1.01	\$1.05
Residential Relocations	6	8	6	Right-of-Way Cost (millions \$)	\$6.80	\$8.35	\$6.80
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$94.85	\$94.56	\$94.85
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	22	23	22				
Noise (Severely Impacted Receptors)	1	1	1				
Vibration (Impacted Structures)	22	22	22				
Section 4(f) Uses- Historic *	2	2	2				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	1	1	1				
Section 4(f) De Minimis- Parks *	1	1	1				
Section 106 Adverse Effects *	1	1	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 49



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative NC1\*

■ Historic Resources (Architectural)

— Alternative NC2

□ County Boundary

— Existing Rail Corridor

■ Municipal Boundary

— Rivers

\* Alternatives NC1 and NC3 were common in this section



## Exhibit 50

### Section T- Alternatives NC1, NC3 on Common Alignment

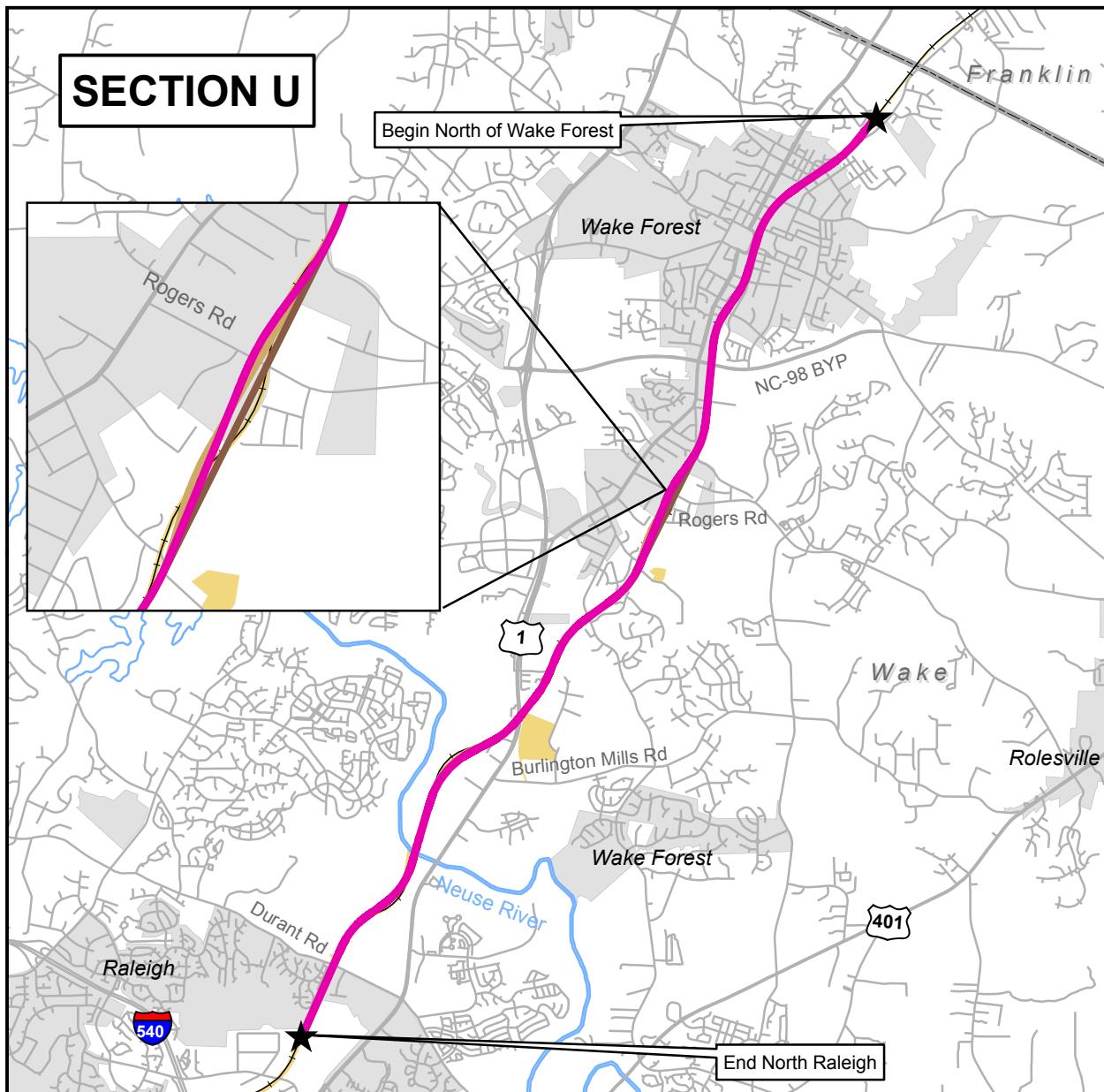
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION T			Topic	SECTION T		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	2.83	2.96	2.83
Number of Stream Crossings	3	3	3	Limiting Speed**	110	95	110
Impacts to Streams (linear feet)	415	94	415	Operability/Constructability***	neutral	negative	neutral
Impacts to Wetlands (acres)	0.07	0.00	0.07	Roadwork (miles)	0.2	1.1	0.2
FEMA Floodplain Crossings	0	0	0				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	41.90	38.45	41.90				
Forested uplands (acres)	21.61	20.16	21.61	Rail and Road Construction Cost (millions \$)	\$50.00	\$53.60	\$50.00
Hazardous Materials Sites	1	2	1	Utility Relocation Cost (millions \$)	\$0.90	\$0.34	\$0.90
Residential Relocations	3	2	3	Right-of-Way Cost (millions \$)	\$2.96	\$2.52	\$2.96
Business Relocations	0	0	0	<b>TOTAL COSTS</b> (millions \$)	\$53.86	\$56.46	\$53.86
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	25	25	25				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	5	10	5				
Section 4(f) Uses- Historic *	1	1	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	1	1	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 51



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

— Recommended Preferred Alternative NC3	County Boundary
— Alternative NC1	Municipal Boundary
— Alternative NC2	Historic Resources (Architectural)
— Existing Rail Corridor	
— Rivers	



## Exhibit 52

### Section U- Alternatives NC1, NC2, NC3 on Different Alignments

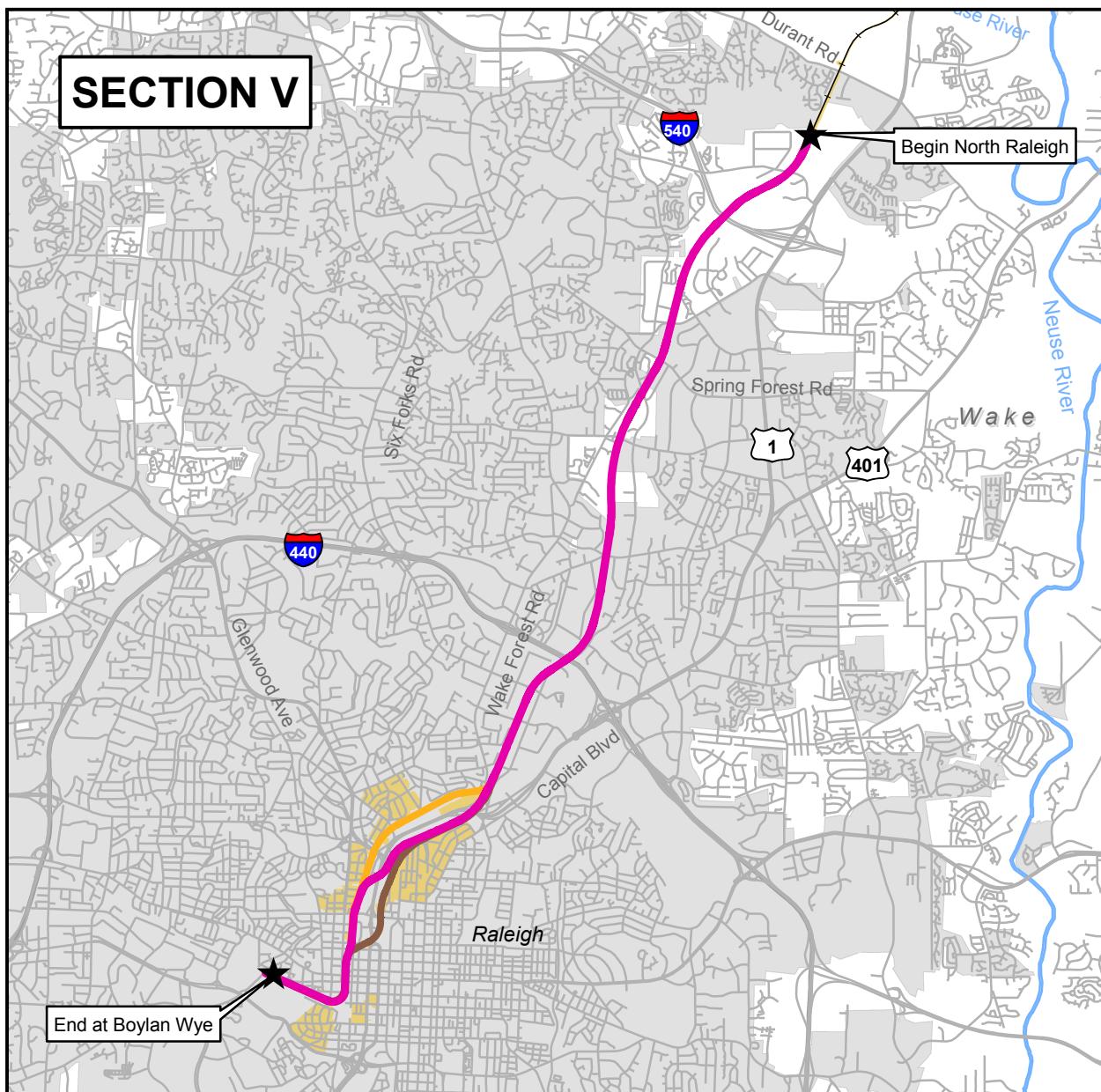
Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION U			Topic	SECTION U		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	8.88	8.89	8.88
Number of Stream Crossings	19	19	19	Limiting Speed**	85	80	85
Impacts to Streams (linear feet)	3,718	3,010	3,485	Operability/Constructability***	neutral	negative	neutral
Impacts to Wetlands (acres)	0.25	0.21	0.20	Roadwork (miles)	4	4	4
FEMA Floodplain Crossings	1	1	1				
Federal/State Designated Rivers (crossings)	1	1	1				
Impacts to Prime and Other Important Farmland (acres)	87.20	84.56	86.01				
Forested uplands (acres)	70.87	70.07	71.06	Rail and Road Construction Cost (millions \$)	\$88.70	\$84.40	\$86.40
Hazardous Materials Sites	10	10	10	Utility Relocation Cost (millions \$)	\$2.11	\$2.11	\$2.11
Residential Relocations	10	8	10	Right-of-Way Cost (millions \$)	\$26.25	\$24.61	\$25.76
Business Relocations	17	17	16	<b>TOTAL COSTS</b> (millions \$)	\$117.06	\$111.12	\$114.27
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	159	161	159				
Noise (Severely Impacted Receptors)	17	17	17				
Vibration (Impacted Structures)	45	45	45				
Section 4(f) Uses- Historic *	1	1	1				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	0	0	0				
Section 4(f) De Minimis- Parks *	0	0	0				
Section 106 Adverse Effects *	1	1	1				

Indicates Recommended Preferred Alternative.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

Exhibit 53



**Southeast High Speed Rail, Richmond, VA to Raleigh, NC**

- Recommended Preferred Alternative NC5
- Alternative NC1/NC2\*
- Alternative NC3
- Existing Rail Corridor
- Rivers

■ Historic Resources (Architectural)

□ County Boundary

■ Municipal Boundary

\* Alternatives NC1 and NC2 were common in this section, except for minor differences within the Boylan Wye

0 1 2 Miles



## Exhibit 54

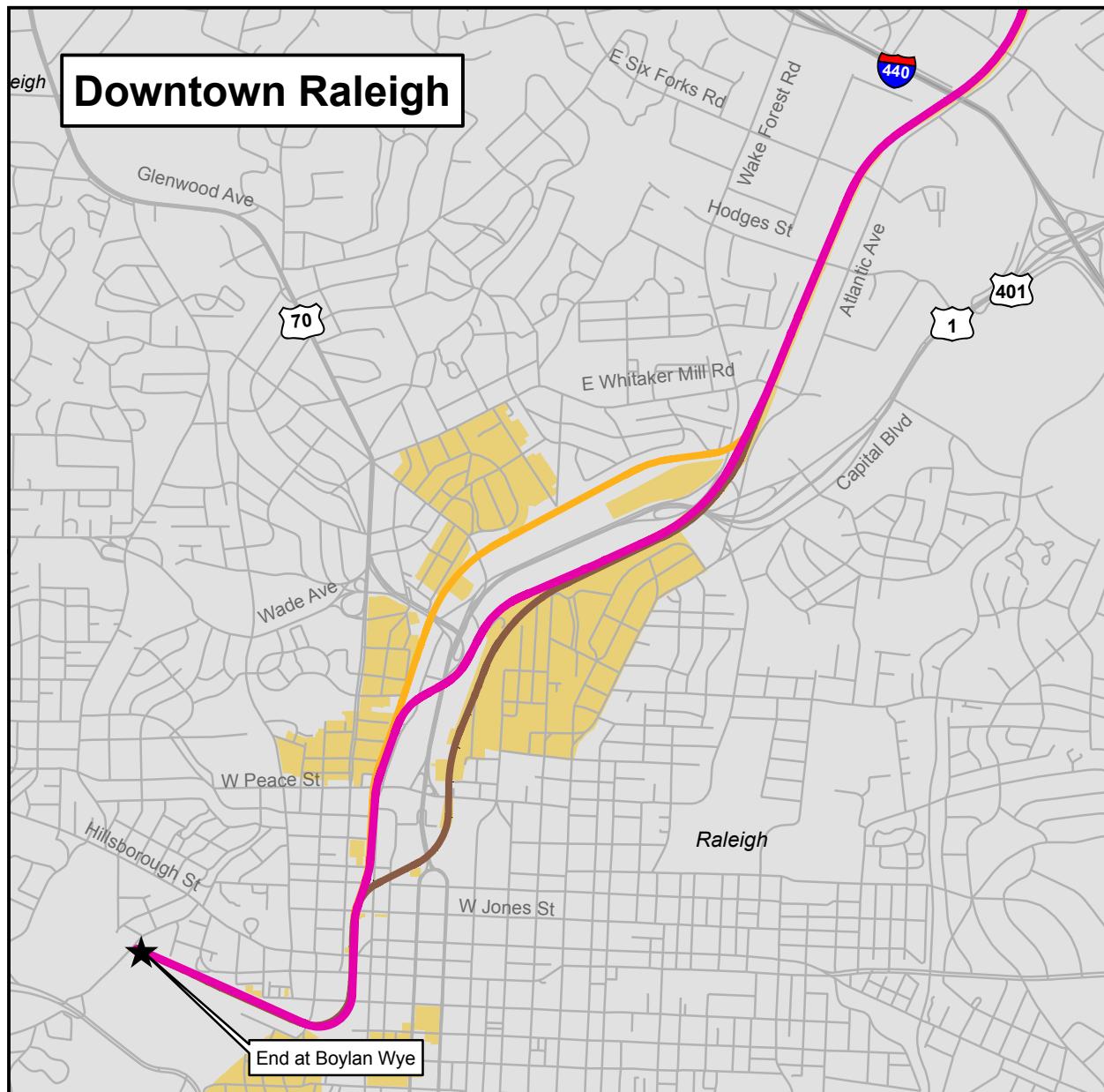
### Section V- Alternatives NC1, NC2, NC3 on Different Alignments

Summary of Potential Human and Natural Impacts By Section				Summary of Operational & Physical Characteristics By Section			
Topic	SECTION V			Topic	SECTION V		
	NC1	NC2	NC3		NC1	NC2	NC3
Federally Listed T&E Species Impacted	0	0	0	Mainline Track Length (miles)	9.89	9.91	9.97
Number of Stream Crossings	16	16	15	Limiting Speed**	45	45	45
Impacts to Streams (linear feet)	1,105	1,107	1,182	Operability/Constructability***	negative	negative	positive
Impacts to Wetlands (acres)	0.06	0.06	0.05	Roadwork (miles)	3	3.1	2.7
FEMA Floodplain Crossings	4	4	3				
Federal/State Designated Rivers (crossings)	0	0	0				
Impacts to Prime and Other Important Farmland (acres)	25.80	25.80	25.80				
Forested uplands (acres)	16.92	16.92	17.04	Rail and Road Construction Cost (millions \$)	\$148.20	\$149.40	\$157.50
Hazardous Materials Sites	76	58	58	Utility Relocation Cost (millions \$)	\$2.64	\$2.64	\$2.45
Residential Relocations	0	1	0	Right-of-Way Cost (millions \$)	\$53.34	\$56.47	\$90.24
Business Relocations	23	20	54	<b>TOTAL COSTS</b> (millions \$)	\$204.18	\$208.51	\$250.19
Public Schools Impacted	0	0	0				
Noise (Impacted Receptors)	92	92	92				
Noise (Severely Impacted Receptors)	0	0	0				
Vibration (Impacted Structures)	48	48	48				
Section 4(f) Uses- Historic *	3	3	2				
Section 4(f) Uses- Parks *	0	0	0				
Section 4(f) De Minimis- Historic *	2	2	3				
Section 4(f) De Minimis- Parks *	1	1	1				
Section 106 Adverse Effects *	3	3	2				

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.

## Exhibit 55



### Southeast High Speed Rail, Richmond, VA to Raleigh, NC

— Recommended Preferred Alternative NC5	■ Historic Resources (Architectural)
— Alternative NC1/NC2*	□ County Boundary
— Alternative NC3	■ Municipal Boundary
— Existing Rail Corridor	
— Rivers	

\* Alternatives NC1 and NC2 were common in this section, except for minor differences within the Boylan Wye

0 1 Miles



**Exhibit 56**  
**Section V in Downtown Raleigh- Whittaker Mill Road to Boylan Wye**  
**Alternatives NC1, NC2, NC3, NC5 on Different Alignments**

Summary of Potential Human and Natural Impacts					Summary of Operational & Physical Characteristics				
Topic	Downtown Raleigh				Topic	Downtown Raleigh			
	NC1	NC2	NC3	NC5		NC1	NC2	NC3	NC5
Federally Listed T&E Species Impacted	0	0	0	0	Mainline Track Length (miles)	3.4	3.42	3.49	3.43
Number of Stream Crossings	3	3	2	5	Limiting Speed**	45	45	45	45
Impacts to Streams (linear feet)	183	183	260	115	Operability/Constructability***	negative	negative	positive	positive
Impacts to Wetlands (acres)	0.01	0.01	0.00	0.00	Roadwork (miles)	0.44	0.44	0.21	0.34
FEMA Floodplain Crossings	1	1	0	2					
Federal/State Designated Rivers (crossings)	0	0	0	0					
Impacts to Prime and Other Important Farmland (acres)	0	0	0	0					
Forested uplands (acres)	0	0	0.12	0	Rail and Road Construction Cost (millions \$)	\$65.60	\$64.00	\$99.00	\$131.00
Hazardous Materials Sites	32	31	49	39	Utility Relocation Cost (millions \$)	\$1.08	\$1.08	\$0.96	\$0.79
Residential Relocations	0	0	1	0	Right-of-Way Cost (millions \$)	\$14.20	\$14.90	\$37.68	\$26.65
Business Relocations	11	10	54	48	<b>TOTAL COSTS</b> (millions \$)	\$80.88	\$79.98	\$137.64	\$158.44
Public Schools Impacted	0	0	0	0					
Total Noise Impacted Receptors	82	82	92	81					
Severe Impacts (subset of total)	40	40	40	1					
Vibration (Impacted Structures)	49	49	59	18					
Section 4(f) Uses- Historic *	3	3	2	1					
Section 4(f) Uses- Parks	0	0	0	0					
Section 4(f) De Minimis- Historic	1	1	1	0					
Section 4(f) De Minimis- Parks	0	0	0	0					
Section 106 Adverse Effects *	3	3	2	1					

  Indicates Recommended Preferred Alternative.

\*Impacts to the Raleigh and Gaston Railroad Corridor are common among all alternatives.

\*\* Limiting Speed is the maximum train speed through the most restrictive curve within the section based on current design assumptions; average running speed through the section could be greater.

\*\*\* Positive-negative-neutral denotes significant differences in operability or constructability between the alternatives.